AD-A144 606 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS ASPINOOK DAM (CT 0053.. (U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV NOV 79 1/1

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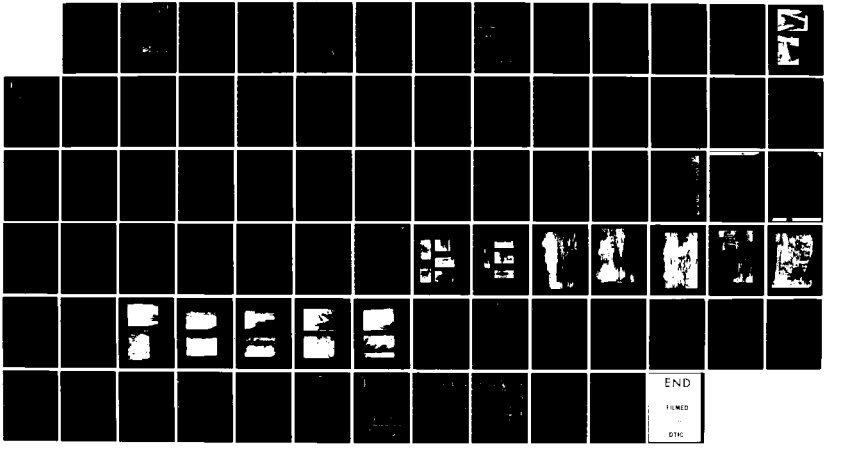

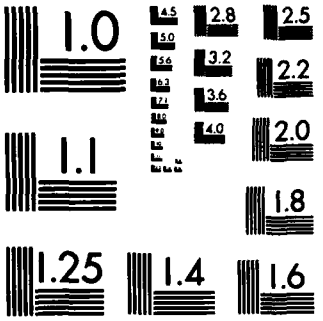

THAMES RIVER BASIN
GRISWALD/LISBON, CONNECTICUT

ASPINOOK DAM

CT. 00539

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

NOVEMBER 1979

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Thames River Basin
Griswald/Lisbon, Connecticut

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Aspinook Pond Dam is a massive masonry and concrete structure spanning the Quinebaug River. It consists of a 410 ft. long overflow structure with a concrete crest, a short masonry right abutment training wall, and a 135 ft. long masonry left abutment. The entire length of the dam is 550 ft. The height of the dam is about 21.5 ft. The size classification is governed by storage and is thus intermediate. The dam is judged to be in fair condition. Based upon the guidelines, the recommended test flood ranges from a ½ PMF to a full PMF.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF
NEDED

FEB 4 1980

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the Aspinook Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Wyre Wynd, Inc. Jewett City, Connecticut.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

ASPINOOK POND DAM

CT 00539

THAMES RIVER BASIN
GRISWOLD & LISBON, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No.:	CT 00539
Name of Dam:	Aspinook Pond Dam
Town:	Griswold & Lisbon
County and State:	New London, Connecticut
Stream:	Quinebaug River
Date of Inspection:	26 October 1979

BRIEF ASSESSMENT

Aspinook Pond Dam is a massive masonry and concrete structure spanning the Quinebaug River. It consists of a 410 ft. long overflow structure with a concrete crest, a short masonry right abutment training wall, and a 135 ft. long masonry left abutment, which forms one wall of a large forebay basin. The entire length of the dam is about 550 ft. It is a run-of-the-river dam, which once furnished the power needs of a mill located downstream on the left bank of the river. The dam is now used to impound water for cooling and fire protection systems at the Wyre Wynd, Incorporated plant, which now occupies the original mill site.

The pond behind the dam is about 12,500 ft. long and has a surface area at spillway level of about 246 acres. The drainage area above the dam is 668 sq. mi. and maximum storage to top of dam is estimated at about 7,450 acre-ft. The height of the dam is about 21.5 ft.; the size classification is governed by storage and is thus intermediate. A breach of the dam would cause damage to the plant located immediately downstream and seven or eight homes located about 4,000 ft. downstream of the dam. Thus, the dam has been classified as having a significant hazard potential. Based upon the guidelines, the recommended test flood ranges from a ½ PMF to a full PMF. A test flood equal to the ½ PMF (82,000 cfs) was selected. Since storage is insignificant, a test flood routing was not performed.

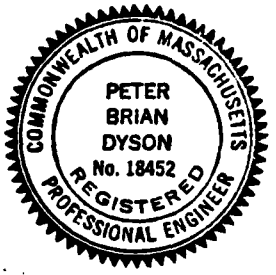
The test flood outflow would overtop the left abutment by about 5.2 ft. at which time the dam would be nearly submerged by tail water effects. The spillway can pass 36,600 cfs or about 45 percent of the test flood outflow without overtopping the left abutment.

The dam is judged to be in fair condition owing to the absence of an operative dewatering facility. Water was flowing to a depth of about 6 in. over the crest of the spillway at the time of the inspection, so it was not possible to observe the condition of the downstream face or the crest of the overflow section. Nevertheless, the water appeared to be flowing uniformly with no evidence of turbulence or missing or eroded elements. There was some vegetation growing on the face of the left abutment walls. A slight amount of leakage was noted to be coming through the walls of the left abutment. Sluice gates leading into and out of the forebay were all inoperative and leaking. There is a small depression in the earthfill immediately behind the right masonry abutment wall.

Within one year after receipt of this Phase I Inspection Report, the owner, Wyre Wynd Incorporated, should retain the services of a registered professional engineer and implement the results of his evaluation of the following: (1) assess further the potential for overtopping and the adequacy of the spillway; (2) inspect the spillway during a period of low flow or no flow conditions; (3) investigate the structural and hydraulic aspects of restoring the forebay sluice gates for use as a low level dewatering facility, or of making other provisions for a low level outlet; and (4) investigate the causes of leaks in walls, gates, and penstocks and provide for corrective measures to the extent judged necessary.

The owner should also implement the following operating and maintenance measures: (1) remove trees, root structures, and vegetative growth from the joints in masonry walls and repoint same; (2) monitor once per month seepage through the downstream side of the wall separating the left abutment from the forebay structure; (3) monitor once per month standing water at the toe of the west forebay wall, beneath the side outlet gates; (4) pending completion of leakage investigations, monitor all leaks on a monthly basis for changes in volume and turbidity; (5) clean out deteriorated mortar on the right abutment wall and repoint; (6) clean out, refill with an impermeable soil, and reseed the depression in the ground on the right side of the right abutment wall; (7) develop a formal surveillance and flood warning plan; and (8) institute procedures for an annual periodic technical inspection of the dam and its appurtenant structures.

Peter B. Dyson
Project Manager



This Phase I Inspection Report on Aspinook Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

RICHARD DIBUONO, MEMBER
Water Control Branch
Engineering Division

ARAMAST MAHTESIAN, MEMBER
Foundation & Materials Branch
Engineering Division

CARNEY M. TERZIAN, CHAIRMAN
Design Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation: however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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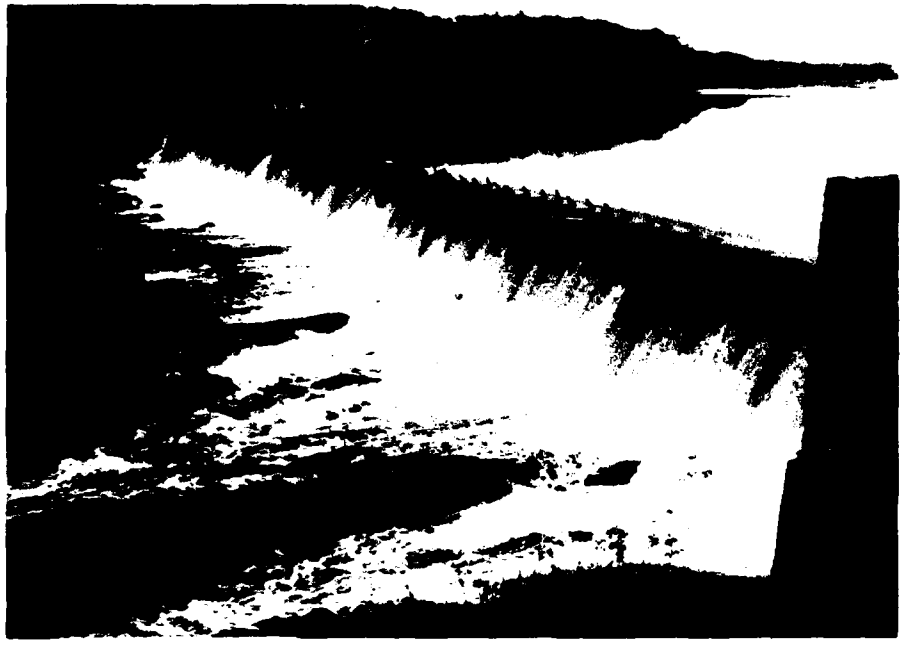
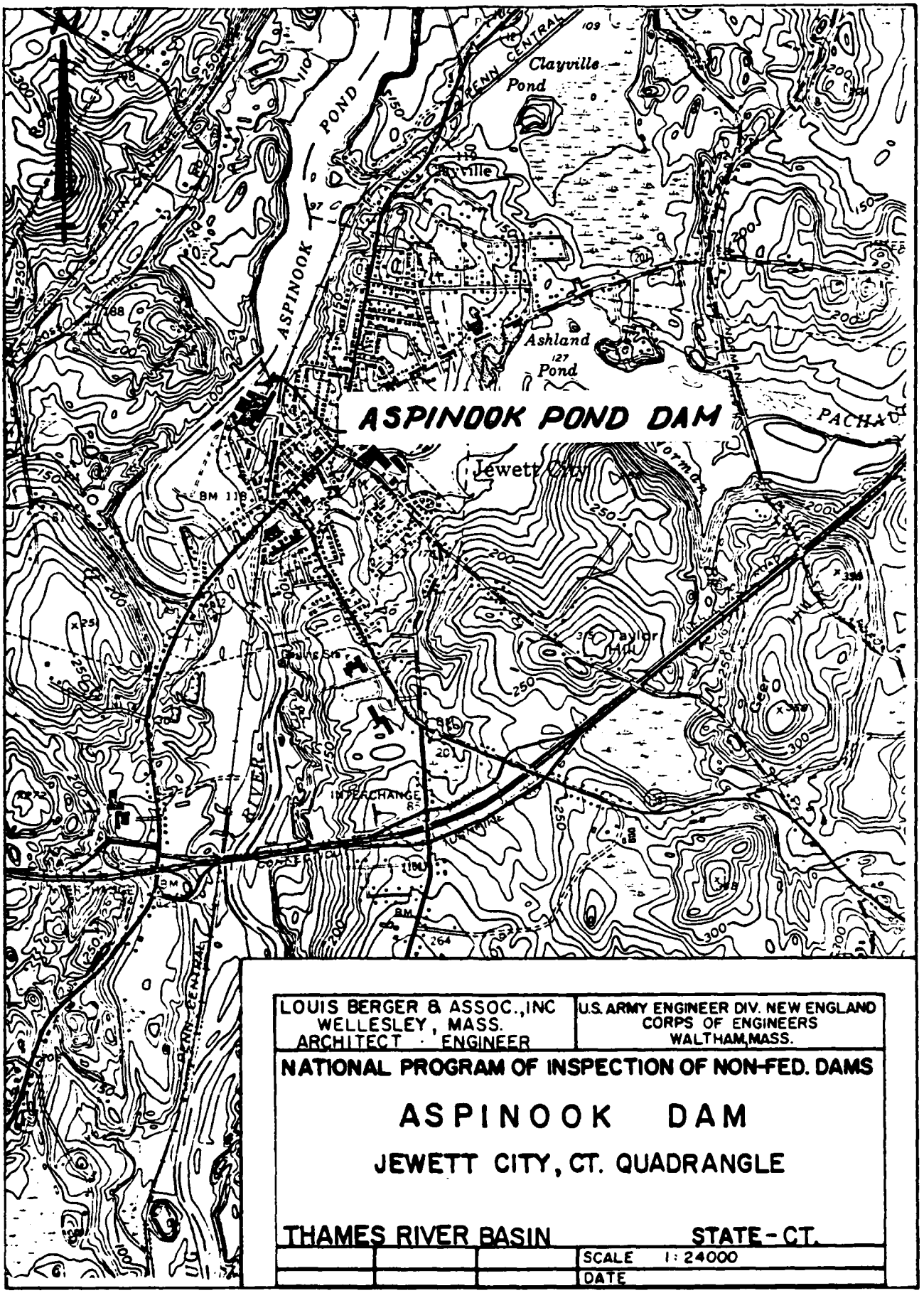


Overview from left abutment.

Overview from
right abutment.



LOUIS BERGER & ASSOC., INC WELLESLEY, MASS. ARCHITECT · ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

ASPINOOK DAM

JEWETT CITY, CT. QUADRANGLE

THAMES RIVER BASIN — STATE - CT.

SCALE 1:24000

DATE

PHASE I INSPECTION REPORT

ASPINOOK POND DAM CT 00539

SECTION 1 - PROJECT INFORMATION

1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Louis Berger & Associates, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to Louis Berger & Associates, Inc. under a letter of 28 September 1979 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-79-C-0051, Job Change No. 2, has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection

(1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.

(3) Update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location. Aspinook Pond and Dam are located on the Quinebaug River about 7.8 miles upstream from the river's confluence with the Shetucket River and about 0.9 mile upstream of the Quinebaug River's confluence with the Pachaug River. The damsite is located near the community of Jewett City in the towns of Lisbon and Griswold, New London County, Connecticut. It is shown on U.S.G.S., Quadrangle Fitchville, Connecticut, with coordinates approximately at N 41° 36' 36", W 71° 59' 10".

b. Description of Dam and Appurtenances. Aspinook Pond Dam is a run-of-the-river dam, constructed around 1913 to supply water for manufacturing processes and for the generation of electrical power for a mill located just south of the dam. Though the dam no longer serves its original purpose, it now supplies cooling and fire protection water to the Wyre Wynd plant situated on the site of the original mill.

Essentially, the dam consists of a long straight overflow section about 410 ft. long, believed to be constructed of grouted rubble masonry with a concrete crest, and left and right mortared rubble masonry abutments. The right abutment wall intersects natural ground a short distance above the spillway. The left abutment is about 135 ft. long and has an upstream vertical face constructed of mortared rubble masonry and brick, through which five 10 ft. x 10 ft. sluice gates lead to a forebay basin about 60 ft. wide and 250 ft. long. The forebay has eight gated outlets, five of which are low level sluices, back to the Quinebaug River and three lead to abandoned 6 ft. dia. penstocks at the south end of the forebay. The forebay basin also has a weir for discharging waste waters to the Quinebaug River. The weir is about 110 ft. long and its crest is about 7.1 ft. below the top of the left abutment. A small structure housing fire fighting pumps is located on the east side of the forebay. A 36 in. dia. steel pipe provides cooling water from the forebay basin to the plant. A 24 in. dia. pipe has been cut off and is evidently disused.

c. Size Classification. Aspinook Pond Dam has a hydraulic height of about 21.5 ft. above downstream river level, and impounds a normal storage of about 2,645 acre-ft. to spillway crest level and a maximum of about 7,450 acre-ft. to the top of the left abutment. In accordance with the size and capacity criteria given in Recommended Guidelines for Safety Inspection of Dams, storage capacity governs and the project falls into the intermediate category and therefore is classified accordingly.

d. Hazard Classification. The Quinebaug River below Aspinook Pond Dam flows through a 7.8 mile long narrow valley, before emptying into the Shetucket River. In the 4,000 ft. reach immediately below the dam it is anticipated that significant property damage could take place should a breach of the dam occur. The industrial plant of the Wyre Wynd Company is located just downstream of the dam on the left bank. Further downstream about seven homes on the left bank and one on the right bank would be affected by high water. A wooden trestle bridge carrying a water main which is located just upstream of the Routes 138 and 201 bridge might also sustain damage in the event of high water. Below the Routes 138 and 201 bridge it is not anticipated that any other property damage would occur along the Quinebaug River with the exception of some minor flooding of the Penn Central Railway track.

It is estimated that a breach of the dam with the water level at the top of dam would cause about a 4 ft. rise in stage of the already swollen river in the vicinity of the industrial complex below the dam and the homes just downstream of the plant buildings. Such a sudden breach could cause the loss of a few lives and result in appreciable community and industrial economic losses. Consequently, Aspinook Pond Dam has been classified as having a significant hazard potential, in accordance with the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership. Aspinook Pond Dam is owned by Wyre Wynd, Incorporated, Jewett City Industrial Park, Jewett City, Connecticut.

f. Operator. Mr. Fred W. Stackpole, Jr., Executive Vice President, Wyre Wynd, Incorporated, Jewett City Industrial Park, Andover St., Jewett City, Connecticut 06351. Tel: 203-376-2526.

g. Purpose of Dam. The dam was originally constructed to supply water for manufacturing processes and for the generation of electricity for the Aspinook Mill. The impounded waters now furnish cooling water and fire protection for the plant located just downstream of the dam on the site of the old mill. The present owner has expressed an interest in the possibility of once again using the facilities for generating electrical power.

h. Design and Construction History. No information is available regarding design and construction of the present dam. The dam is believed to have been constructed in 1913. The remains of an earlier dam at the site can still be discerned just upstream of the present dam. This earlier dam was constructed in 1892 and was of earth and rock crib construction. Copies of photographs showing construction of the original 1892 dam can be found in Appendix B.

i. Normal Operating Procedures. There are no operational procedures for Aspinook Pond Dam at the present time, with the exception of drawing water via a 36 in. dia. steel pipe from the forebay basin for the plant's cooling and fire protection systems.

1.3 Pertinent Data

a. Drainage Area. The drainage area above Aspinook Pond Dam encompasses about 668 sq. mi. The upper reaches extend into the states of Massachusetts and Rhode Island and the terrain in the basin can best be described as rolling. The basin contains numerous mill ponds, lakes and reservoirs, among which are five U.S. Army Corps of Engineers (CE) flood control facilities. These five are East Brimfield Lake with a drainage area of 67.5 sq. mi., Westville Lake with a drainage area of 99.1 sq. mi., West Thompson Lake with a drainage area of 173.5 sq. mi., Hodges Village Reservoir with a drainage area of 31.1 sq. mi. and Buffumville Lake with a drainage area of 26.5 sq. mi. The East Brimfield and Westville dams are located within the watershed controlled by the West Thompson Dam; thus the total net drainage area controlled by the CE dams is about 231 sq. mi., leaving an uncontrolled balance of the Aspinook Pond drainage area of 437 sq. mi., which includes Lake Webster.

b. Discharge at Damsite.

(1) Outlet Works Conduit. Discharges from Aspinook Pond could be provided for via the forebay basin, by means of the five inlet sluice gates located at the entrance to the forebay and the five low level sluices on the west side of the forebay which allow waste water to be dumped back into the river below the dam. At the present time, however, none of these gates are in an operative condition. If the gates were operative it is estimated that the facility would be capable of discharging about 4,000 cfs with the water surface level in the pond at the top of dam.

(2) Maximum Known Flood at Damsite. The maximum discharge at the damsite is unknown. Flood profiles for the 1936, 1938 and 1955 floods for the reach between Aspinook Pond Dam and U.S.G.S. Gaging Station 01127000, located about 6,200 ft. downstream of the dam, have been furnished to the Wyre Wynd Company by the State of Connecticut, Water Resources Commission. These flood profiles can be found in Appendix B. They show the 1955 flood to be the storm of record.

Data recorded at U.S.G.S. Station 01127000 also indicates that the storm of record for a period dating back to July, 1918 was on August 20, 1955 when the discharge at the gage was computed to be 40,700 cfs and the stage was 29.0 ft. The drainage area above the gage is 715 sq. mi. compared with the drainage area above the dam of 668 sq. mi. The flood profile indicates that the water surface above the dam was about 104 MSL or about 8.7 ft. above the crest of the dam. Based on the information exhibited in Appendix B and the rating curves prepared and found in this report, it was estimated that the CE flood control projects above the dam which were all completed after 1955, would lower the stage above the crest of Aspinook Pond Dam by about 3.5 ft., or to an elevation of about 100.5 ft., in the event of a recurrence of the 1955 flood. The discharge at the gage for a recurrence of the 1955 flood is estimated by CE to be 17,500 cfs.

(3) Ungated Spillway Capacity at Top of Dam. The total spillway capacity at top of abutment, elevation 103.5, is 36,600 cfs.

(4) Ungated Spillway Capacity at Test Flood Elevation. The ungated spillway capacity is about 78,700 cfs at test flood elevation 109.7 NGVD.

(5) Gated Spillway Capacity at Normal Pool Elevation. Not applicable.

(6) Gated Spillway Capacity at Test Flood Elevation. Not applicable.

(7) Total Spillway Capacity at Test Flood Elevation. The total spillway capacity at the test flood elevation is the same as (4) above, 78,700 cfs at elevation 109.7 NGVD.

(8) Total Project Discharge at Test Flood Elevation. The total project discharge at test flood is about 82,000 cfs at elevation 109.7 NGVD.

c. Elevations (Ft. above NGVD)

(1) Streambed at centerline of dam - 82.0

(2) Maximum tailwater - Not available

(3) Upstream portal invert diversion tunnel - Not applicable

(4) Recreation pool - Not applicable

(5) Full flood control pool - Not applicable

(6) Ungated spillway crest - 95.3

(7) Design surcharge (original design) - Unknown

(8) Top of non-overflow abutment - 103.5 left abutment
104.5 right abutment

(9) Test flood design surcharge - 109.7

d. Reservoir

(1) Length of maximum pool - 8.3 mi.

(2) Length of recreation pool - Not applicable

(3) Length of flood control pool - Not applicable

e. Storage (acre-ft.)

(1) Recreation pool - Not applicable

(2) Flood control pool - Not applicable

(3) Spillway crest pool El. 95.3 - 2,645

(4) Top of non-overflow abutment El. 103.5 - 7,450

(5) Test flood pool El. 109.7 - 13,600

f. Reservoir Surface (acres)

(1) Recreation pool - Not applicable

(2) Flood control pool - Not applicable

(3) Spillway crest El. 95.3 - 246

(4) Top of non-overflow abutment El. 103.5 - 830

(5) Test flood pool El. 109.7 - 1,180

g. Dam

(1) Type - Gravity overflow with downstream masonry section

(2) Length - 550 ft.

(3) Height - 21.5 ft. ±

(4) Top width - Varies

(5) Side slopes - overflow section - Downstream slight batter, Upstream about 2 horizontal to 1 vertical

(6) Zoning - Unknown

(7) Impervious core - Unknown

(8) Cutoff - Unknown

(9) Grout curtain - Unknown

h. Diversion and Regulating Tunnel - Not applicable

i. Spillway

(1) Type - Overflow gravity dam

(2) Length of weir - 410 ft.

(3) Crest elevation - 95.3 NGVD

(4) Gates - None

(5) Upstream channel - Natural river channel

(6) Downstream channel - Natural river channel

j. Regulating Outlets

(1) Invert - 84.0 NGVD Approximately

(2) Size - Five 10' x 10' square openings

(3) Description - Five square sluiceways in left abutment.

(4) Control mechanism - Hand operated, geared, sluice gates, all mechanisms inoperative or missing.

SECTION 2 - ENGINEERING DATA

2.1 Design Data

No data on the design of the dam or appurtenances has been recovered. In the course of the inspection a sketch plan of the dam was made which is shown in Appendix B.

2.2 Construction Data

No records or correspondence regarding construction have been found. Copies of photographs showing the construction of an earlier dam located just upstream of the present dam are included in Appendix B. Remains of this earlier dam lie submerged about 40 ft. upstream of the present Aspinook Pond Dam.

2.3 Operation Data

The dam is operated by the owner, Wyre Wynd, Incorporated. There appear to be no formal records of operation. The only operative facility is believed to be the 36 in. dia. pipe supplying cooling water to the plant.

2.4 Evaluation of Data

a. Availability. Since no engineering data is available, it is not possible to make an assessment of the safety of the dam. The basis of the information presented in this report is principally the visual observations of the inspection team.

b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance history and sound engineering judgement.

c. Validity. Not applicable.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General. The visual inspection of Aspinook Pond Dam took place on 26 October 1979. On that date water was flowing about 6 in. above the crest of the spillway, the discharge being estimated to be about 550 cfs. The dam was judged to be in fair condition owing to the absence of an operative dewatering facility. There was no evidence of any major maintenance problems, but several items require attention (see Section 7.2 and 7.3).

b. Dam. The dam is a run-of-the-river dam with an overall length of about 550 ft. and a height of about 21.5 ft. Many rock outcrops are evident on both abutments, and in the stream bed below the dam, indicating that the dam is probably well founded on rock (Appendix C, Photo No. 1).

The right abutment wall is short and soon meets natural ground. It is constructed of grouted rubble stone masonry and was in generally good condition. There was, however, some loss of mortar which had caused several voids to appear on the river side of the wall. On the inboard side of the abutment wall along the axis of the crest of the over flow section, a depression 2 ft. deep and 2 ft. in diameter was present. It was not possible to determine whether the depression was a disused animal burrow, or a sinkhole caused by loss of soil through the wall. Examination of the area around the voids on the river side of the wall revealed no evidence of transport of soil through the wall.

The left abutment is about 135 ft. long, is constructed of massive mortared rubble masonry and brick, and serves to separate the overflow section of the dam from the forebay basin complex. Leakage was noticed through its downstream face on the left side. However, the leakage was very low, with no discernible flow (Appendix C, Photo No. 2). The left abutment also contains five inoperative sluice gates for admitting water into the forebay basin.

c. Appurtenant Structures

(1) Spillway. The overflow portion of the dam forms the spillway which is about 410 ft. long, as measured by rangefinder. A 1957 report states that the dam is 455 ft. long (Appendix B). The crest of the spillway is 8.2 ft. below the top of the left abutment wall and 9.2 ft. below the top of the right abutment. The spillway's physical characteristics could not be determined by direct observation since the water flowing over the crest obscured almost all features. However, a 1974 Water Resources Commission report indicates that the dam's overflow section is of grouted rubble stone masonry with a concrete crest, fitted with flashboard pins. A 1957 report states that the dam is constructed of reinforced concrete. The flashboard pins were visible above the 6 in. of water flowing over the crest (Overview Photographs). To the extent visible through the water, the concrete crest of the spillway appeared to be in good condition. The upstream slope of the overflow section was estimated to be about 2 horizontal to 1 vertical with at least local indications of a transition to sloped rock material. Some 40 ft. upstream of the dam, the remnants of an earlier earth and rock crib dam, with a planked crest, were barely distinguishable about 5 ft. below the water surface.

(2) Forebay and Sluice Gates. The forebay basin on the downstream side of the left abutment is about 60 ft. wide and 250 ft. long. All sluice gates into and out of the forebay are badly deteriorated and inoperative. There are five entrance gates to the forebay located in the left abutment (Appendix C, Photo No. 3). There are five other gates in the westerly wall of the forebay. These serve as low level outlet gates (Appendix C, Photo No. 4). At the downstream end of the forebay there are three other outlet gates (Appendix C, Photo No. 5) which at one time provided water to three 6 ft. dia. penstocks, which are now cut off just downstream of the forebay at the site of the demolished power house (Photo No. 6). Two other pipes, 24 in. and 36 in dia., also extend from the forebay to the plant complex. The smaller pipe is concrete encased and has been cut off (Photo No. 7). A 110 ft. long overflow weir is located on the westerly side of the forebay (Photo No. 4); its crest is about 7.1 ft. below the left abutment.

An appreciable amount of leakage out of the forebay basin was evident at the bottom of the two most upstream side outlet gates, and from the three penstocks at the downstream end of the forebay. Timber strutting has been installed at the ends of the three cut-off penstocks to provide support for the old sluice gates (Photo No. 6). There was evidently sufficient flow into the forebay, probably through the entrance gates, to support the supply of cooling water for the plant and the leakage, since the forebay basin was filled almost to the top of the inlet arches with algae-covered water. The westerly wall of the forebay, particularly in the zone of the side outlet gates, was becoming invaded by growth in joints where the mortar had deteriorated. In the arches above the side outlet gates, several trees up to 4 in. in diameter had taken root and were growing on the outside of the vertical wall (Photo No. 8). At the toe of the wall below the side outlet gates there was stagnant algae-covered water separated from the main channel by rock outcrops (Photo No. 2). The source of this water was not determined.

In general the forebay walls appeared in fair condition, despite locally deteriorating mortar, but all inlet and outlet sluice gates appeared to be inoperative.

d. Reservoir Area. The western shore of the pond for almost one mile to the north of the dam is fairly steep, wooded, displays many outcrops, and is stable. The eastern shore north of the dam is retained by a mortared rough masonry wall for about a 500 ft. reach, thence a 3,000 ft. long railroad embankment, beyond which natural rock, wooded and stable terrain resumes.

e. Downstream Channel. The channel immediately downstream of the dam flows between two mortared rubble masonry walls that are about 200 ft. apart (Photo No. 9). Two or three small rocky islets, with appreciable tree growth, occupy the left third of the channel immediately beyond the toe of the dam (Photo No. 1). There is a rock outcrop extending into the river about 75 ft. from the right bank just downstream of the dam (Photo No. 10). The Wyre Wynd plant is located on the left bank of the river just downstream of the dam (Photo No. 9). The rubble masonry training wall is about 14 ft. high in the vicinity of the plant. About 4,000 ft. downstream of the dam the river passes under a bridge carrying Routes 138 and 201 and under a timber trestle supporting a water main. Several houses are situated on the left bank of the river in this area. About 900 ft. beyond the highway bridge the Penn Central Railroad crosses the river. Beyond this point the railroad parallels the river on its right bank as the river continues

on to its confluence with the Shetucket River at a point about 7.8 miles below the dam. No other structures are in close proximity to the river beyond the railroad bridge crossing.

3.2 Evaluation

In general the visual inspection of the dam revealed key characteristics of the project as they may relate to its stability and integrity, to a sufficient degree to permit an assessment to be made of those features affecting the safety of the structure. It was not possible, however, to observe the condition of the 410 ft. long spillway overflow section at the time of the inspection, due to the 6 in. flow over the crest. Nevertheless, the water appeared to be flowing uniformly with no evidence of turbulence or missing or eroded elements.

There was some loss of mortar in both masonry abutment walls, with minor leakage through the left abutment wall. All 13 sluice gates in the walls of the forebay basin appeared to be inoperative. Since considerable leakage was noted from the outlet gates and cooling water for the plant is drawn from the forebay via a 36 in. dia. pipe, it was presumed that some or all of the five inlet gates are partly open. There was some vegetative and brush growth on the walls of the forebay in areas where the mortar had deteriorated.

The Aspinook Pond Dam and appurtenant works were judged to be in fair condition owing to the absence of an operative dewatering facility.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures

Wyre Wynd, Incorporated is the owner and operator of the dam. There are no significant operating devices in working order nor any documented operating procedures for the dam. Plant cooling water is drawn from the forebay basin and a fire pump is installed in a building adjacent to the forebay, with a suction pipe in the basin.

4.2 Maintenance of Dam

There is no maintenance program in effect at Aspinook Pond Dam.

4.3 Maintenance of Operating Facilities

No maintenance program is in effect. All 13 gates in the forebay are believed to be inoperative. Timber struts to support the penstock sluice gates were installed in recent years.

4.4 Description of any Warning System in Effect

No warning system is in effect at Aspinook Pond Dam.

4.5 Evaluation

The ponded water is now used only to provide cooling water for the plant complex and for fire fighting purposes. This supply appears to be somewhat precarious since the collapse of one or more of the forebay basin outlet gates could empty the basin. The owner has expressed an interest in once again using the facility for generating electrical power, but no specific program of implementation has been prepared. Maintenance should include periodic growth removal from the abutment areas, surveillance regarding seeps, repair of the masonry and keeping the spillway clear of debris. The owner should establish a formal warning system.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. General. The Aspinook Pond Dam is a run-of-the-river type project, originally constructed to furnish the water needs of the Aspinook Mill. It is now used to provide a source of cooling and fire protection water for Wyre Wynd, Incorporated, whose plant now occupies the mill site. It is basically a low storage-high spillage dam. It is a rubble masonry structure with a large forebay leading to the site of the demolished power plant.

b. Design Data. No hydrologic or hydraulic design data were retrieved for Aspinook Pond Dam.

c. Experience Data. No records are available in regard to past operation of the dam or of surcharges encroachments and outflows through the spillway. However, there is a flood profile drawing showing the water surfaces in the area that were experienced in the 1936, 1938 and 1955 floods. Also, U.S.G.S. Gaging Station 01127000 is located about 6,200 ft. downstream of the dam on the Quinebaug River. The flood profiles can be found in Appendix B. The profiles show that the 1955 flood caused the highest recorded stage at the dam, when the water surface reached elevation 103.3 NGVD just above the dam and 104.4 at Cory Brook, a stream coming in from the right and located about 2 mi. above the dam. The downstream U.S.G.S. Gaging Station has a period of record dating back to July 1918 and Water Supply Papers for the gage show that the maximum recorded discharge at the gage site was 40,700 cfs on August 20, 1955 when the gage height was 29.0 ft. It has been estimated that in the event of another storm equivalent to the 1955 storm, the stage at the U.S.G.S. Gage would be reduced by about 9.1 ft. because of Corps of Engineers flood control projects constructed upstream of the dam since 1955. Based on this information and the rating curves developed in Appendix D, it is estimated that the stage reduction at Aspinook Dam would be about 3.5 ft. in the event of another storm equivalent to the 1955 storm. The discharge at the gage for a recurrence of the 1955 flood is estimated by CE to be 17,500 cfs.

d. Visual Observations. No evidence which would indicate possible high flows through the reservoir area or in the downstream channel were noted. The owner's representative at the inspection pointed out a marking on the right side of the downstream channel opposite the plant complex where the stage reached about 8 ft. on January 25, 1979.

e. Test Flood Analysis. Aspinook Pond Dam is about 21.5 ft. high and impounds about 7,450 acre-ft. to the top of dam and is therefore classified as intermediate in size. Because of downstream conditions, the hazard potential is classified as significant. In accordance with Recommended Guidelines for Safety Inspection of Dams, the recommended test flood is one half the probable maximum flood to a full probable maximum flood (PMF). Since some flooding of the downstream plant and homes would take place without failure of the dam under any test flood in this range, the magnitude selected as most closely relating to the involved risk was a ½ PMF event.

The NED March 1978 Preliminary Guidance Memorandum for Estimating Probable Discharges was used for estimating the probable maximum flood peak flow rate, which was then divided by two to arrive at the test value. The five upstream Corps of Engineers (CE) projects were also taken into consideration in arriving at the test value. CE upstream flood control storage projects are located in the basin at East Brimfield Lake, Westville Lake, West Thompson Lake, Hodges Village Reservoir, and Buffumville Lake. The West Brimfield and Westville dams are located within the watershed controlled by the West Thompson Dam. Thus, the Buffumville project with a drainage area of 26.5 sq. mi., the Hodges Village project with a drainage area of 31.1 sq. mi. and the West Thompson project with a drainage area of 173.5 sq. mi. were the projects considered to retard the test flood flow at Aspinook Pond Dam. The storage capacity of Lake Webster was not considered.

The CE project drainage areas, totalling about 231 sq. mi., were deducted from the total drainage area above Aspinook Pond Dam leaving a net drainage area of about 437 sq. mi. for computing the test flood. Based on this net drainage area the test flood discharge was determined to be about 188 CSM or about 82,000 cfs. Because of the high discharge and low storage capability of the impoundment above the dam, a test flood routing was not performed.

A discharge curve for the dam was computed (see sheets D-9 thru D-10). With the reservoir to the top of dam (elevation 103.5) the spillway can release about 36,600 cfs or about 45 percent of the test flood outflow. The overflow portion of the dam will not pass the test flood outflow without overtopping the left abutment by about 5.2 ft. In that condition the dam would be nearly submerged by its tailwater and the control for the discharge would shift to a point downstream. It is estimated that the overflow section would be carrying nearly all of the discharge at this time; the spillage over the non-overflow sections of the dam would be less than 4 percent of the total discharge.

f. Dam Failure Analysis. A breach owing to structural failure of the dam is a possibility. For this analysis a breach was assumed with the water level at the top of the left abutment. The "rule of thumb" criteria suggested in the NED March 1978 Guidance Report was used for the breach analysis. With a breach width of 40 percent of the overflow section length or 164 ft., a sudden surge of about 27,500 cfs would be realized in addition to a flow of 22,000 cfs from the remaining portion of the spillway, giving a total discharge of 49,500 cfs (Sheets D-11 and 12).

The most significant property damage and potential for loss of a few lives resulting from a sudden breach of the dam would occur in the 4,000 ft. reach between the dam and the Route 138 and 201 highway bridge. Within this reach, the Wyre Wynd plant complex is located on the left bank of the Quinebaug River just downstream of the dam and there are several houses situated relatively low on the left bank of the river just upstream of the highway bridge. There is also a wooden truss bridge supporting a water main. It is estimated that a breach of the dam would produce a river stage up to an elevation of about 96.0 NGVD, or a sudden rise of about 4 ft. in this area. Beyond the highway bridge it is estimated that the Penn Central Railway would sustain minor flooding. From the highway bridge to the confluence of the Shetucket River there are no other low lying structures along the Quinebaug River.

In summary, it is estimated that a breach of the dam under these conditions would cause additional flooding in the already swollen reach of the river between the dam and the Route 138 and 201 bridge, that the plant complex would sustain additional property damage and seven or eight homes located just above the highway bridge would be subject to significant flooding. The access road from Routes 138 and 201 leading to the mill complex would be flooded out. The truss bridge supporting a water main might also sustain damage. (See Appendix D, Sheet D-13 which shows the area of potential flooding.)

SECTION 6 - STRUCTURAL EVALUATION

6.1 Evaluation of Structural Stability

a. Visual Observation. There are no design calculations available for review of the structural stability of the dam and appurtenant structures. However, the field investigations and findings described herein do not indicate any displacement and/or distress which would warrant the preparation of structural stability calculations. The dam is now stable, but some repairs to masonry walls are needed and further investigations should be conducted, as described in Section 7.

b. Design and Construction of Dam. No evidence has come to hand on the configuration of the dam, or the criteria used for design. The dam, apparently completed in 1913, originally supplied power and processing water to the former mill. It still supplies cooling water to the modern plant occupying the old mill site.

c. Operating Records. No operating records were recovered and none of any significance to structural stability are known to exist.

d. Post-Construction Changes. There are no known records or evidence of post-construction changes to the dam proper. However, subsequent to the construction of the dam, the original power house has been razed, the penstocks from the forebay have been severed, and some of the sluice gates have been rendered inoperative by the removal of lifting frames, handwheels, pinions and the like.

e. Seismic Stability. The dam is located in Seismic Zone No. 1 and in accordance with Phase I guidelines does not warrant seismic analyses.

SECTION 7
ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. On the basis of the Phase I visual examination, Aspinook Pond Dam is judged to be in generally fair condition owing to the lack of an operative dewatering system. The deficiencies revealed indicate that further investigations should be carried out and some remedial work is needed. The principal concerns with the overall integrity of the dam are as follows:

(1) The spillway will only pass about 45 percent of the test flood outflow without overtopping the abutment.

(2) The inoperative condition of the sluice gates located at the entrance and exit points of the forebay, through which there is considerable leakage.

(3) The need for an inspection of the overflow section of the dam at a time of no flow or low flow over the crest.

b. Adequacy of Information. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance history and sound engineering judgement.

c. Urgency. The recommendations and remedial measures enumerated below should be implemented by the owner within one year after receipt of this Phase I Inspection Report.

d. Need for Additional Investigations. Additional investigations are required as recommended in Para. 7.2.

7.2 Recommendations

It is recommended that the owner should retain the services of a competent registered professional engineer to make investigations and studies of the following, and if proved necessary to design appropriate remedial works.

(1) Make a thorough study of the hydrology of the drainage basin, including an assessment of the attenuating effect of Lake Webster, and evaluate further the potential for overtopping the dam and the adequacy of the spillway.

(2) Inspect the spillway during a period of low flow or no flow conditions.

(3) Investigate structural and hydraulic aspects of restoring the forebay sluice gates for use as a low level dewatering facility; if this is not feasible, give consideration to making other provisions for a low level outlet.

(4) Investigate the causes of leakage in walls, gates and penstocks and provide for corrective measures to the extent judged necessary.

7.3 Remedial Measures

a. Operating and Maintenance Procedures

(1) Remove trees, root structures and vegetative growth from joints in masonry, particularly on the west wall of the forebay over the outlet gates, and repoint same.

(2) Monitor once per month seepage through the downstream side of wall separating the left abutment from the forebay structure.

(3) Monitor once per month standing water at toe of west forebay wall, beneath the side outlet gates, for such changes in volume as may assist in assigning a source.

(4) Pending completion of leakage investigations under Section 7.2, monitor all leaks on a monthly basis for changes in volume and turbidity.

(5) Clean out deteriorated mortar on right abutment wall and repoint.

(6) Clean out, refill with an impermeable soil, and reseed the depression in the ground on the right side of the right abutment wall.

(7) Develop a formal surveillance and flood warning plan, including round-the-clock monitoring during periods of heavy precipitation.

(8) Institute procedures for an annual periodic technical inspection of the dam and its appurtenant structures.

7.4 Alternatives

There appear to be no practical alternatives to the above recommendations.

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT Aspinook Pond Dam

DATE 26 October 1979

TIME 9:30 A.M.

WEATHER Clear/Cool

W.S. ELEV. 95.8 U.S. ____ DN.S.

PARTY:

1. Peter B. Dyson	LBA*	6. Richard Monroe (Owner's Rep.)	
2. Pasquale E. Corsetti	LBA	7.	
3. Roger F. Berry	LBA	8.	
4. Carl J. Hoffman	LBA	9.	
5. James Reynolds	GZD	10.	

PROJECT FEATURE	INSPECTED BY	REMARKS
1. Hydrologic	Roger F. Berry	
2. Hydraulic/Structural	Carl J. Hoffman	
3. Soils and Geology	James Reynolds	
4. General Features	Peter B. Dyson	
5. General Features	Pasquale E. Corsetti	
6.		
7.		
8.		
9.		
10.		

*LBA - Louis Berger & Associates, Inc.
GZD - Goldberg, Zoino, Dunnicliff & Assoc., Inc.

PERIODIC INSPECTION CHECKLIST

PROJECT Aspinook Pond Dam DATE 26 October 1979

PROJECT FEATURE Masonry Dam NAME Carl J. Hoffman

DISCIPLINE Structures/Soils NAME James Reynolds

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
Crest Elevation	103.5
Current Pool Elevation	93.8
Maximum Impoundment to Date	104
Surface Cracks	None
Pavement Condition	N/A
Movement or Settlement of Crest	None
Lateral Movement	None
Vertical Alginment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Good, except voids in right abutment wall, some missing mortar.
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	N.A.
Sloughing or Erosion of Slopes or Abutments	N.A.
Rock Slope Protection - Riprap Failures	N.A.
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	See Note (1)
Piping or Boils	N.A. - founded on rock
Foundation Drainage Features	None
Toe Drains	None
Instrumentation System	None

NOTE (1) Slight seepage through southeast abutment wall.

PERIODIC INSPECTION CHECKLIST

PROJECT Aspinook Pond Dam DATE 26 October 1979

PROJECT FEATURE Forebay Basin NAME Carl Hoffman

DISCIPLINE Structures/Geology NAME James Reynolds

AREA EVALUATED	CONDITIONS
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete /Masonry	Fair
Rust or Staining	Yes
Spalling	Yes
Erosion or Cavitation	None
Visible Reinforcing	None
Any Seepage or Efflorescence	Yes, slight seepage
Condition at Joints	Fair
Drain Holes	None
Channel	
Loose Rock or Trees Overhanging Channel	See Note (1)
Condition of Discharge Channel	Good. Rock outcrops. Note (2)

Note (1) Heavy mature growth in joints of stone masonry walls and abutments, particularly above outlets from forebay.

Note (2) Leaks beneath outlet gates from forebay, and from cutoff penstocks. Possible leak through west forebay wall below outlet sluice - standing water, algae covered.

PERIODIC INSPECTION CHECKLIST

PROJECT Aspinook Pond Dam DATE 26 October 1979

PROJECT FEATURE Spillway NAME Carl Hoffman

DISCIPLINE Hydraulics/Structures NAME

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Good
Loose Rock Overhanging Channel	No
Trees Overhanging Channel	No
Floor of Approach Channel	Unknown
b. Weir and Training Walls	
General Condition of Concrete / Masonry	Weir - Not visible (6 in. water) Walls - Good, some mortar missing
Rust or Staining	None evident
Spalling	None evident
Any Visible Reinforcing	None evident
Any Seepage or Efflorescence	None evident
Drain Holes	None
c. Discharge Channel	
General Condition	Good
Loose Rock Overhanging Channel	No
Trees Overhanging Channel	Yes
Floor of Channel	Ledge
Other Obstructions	Tree-covered islets

PROJECT: Aspinook Pond Dam DATE: 26 October 1979

AREA EVALUATED	CONDITIONS
Dike Embankment	N/A
Outlet Works - Control Tower	N/A
Outlet Works - Intake Channel and Intake Structure	N/A
Outlet Works - Transition and Conduit	N/A
Outlet Works - Service Bridge	N/A

APPENDIX B

ENGINEERING DATA

No. 16

WATER RESOURCES COMMISSION
SUPERVISION OF DAMS
INVENTORY DATA

Inventoried By _____

Date _____ 19

Name of Dam or Pond N. Nam. 36 (Aspinook Pond)

Code No. T 14.7 S 3.3 Q 7.5

Nearest Street Location _____

Town Griswold

U.S.G.S. Quad. Jewett City LAT. 41°36.6'

Name of Stream Quinebaug River LONG. 71°59.1'

Owner Wayne Wood -

Address Anthony street Jewett City 06351
OK 12178

DA 630 SM

Pond Used For was a water mill for factory - REC.

Dimensions of Pond: Width _____ Length _____ Area 330.

Total Length of Dam [illegible] Length of Spillway 50'

Location of Spillway [illegible]

Height of Pond Above Stream Bed 12'16'

Height of Embankment Above Spillway 6'

Type of Spillway Construction [illegible]

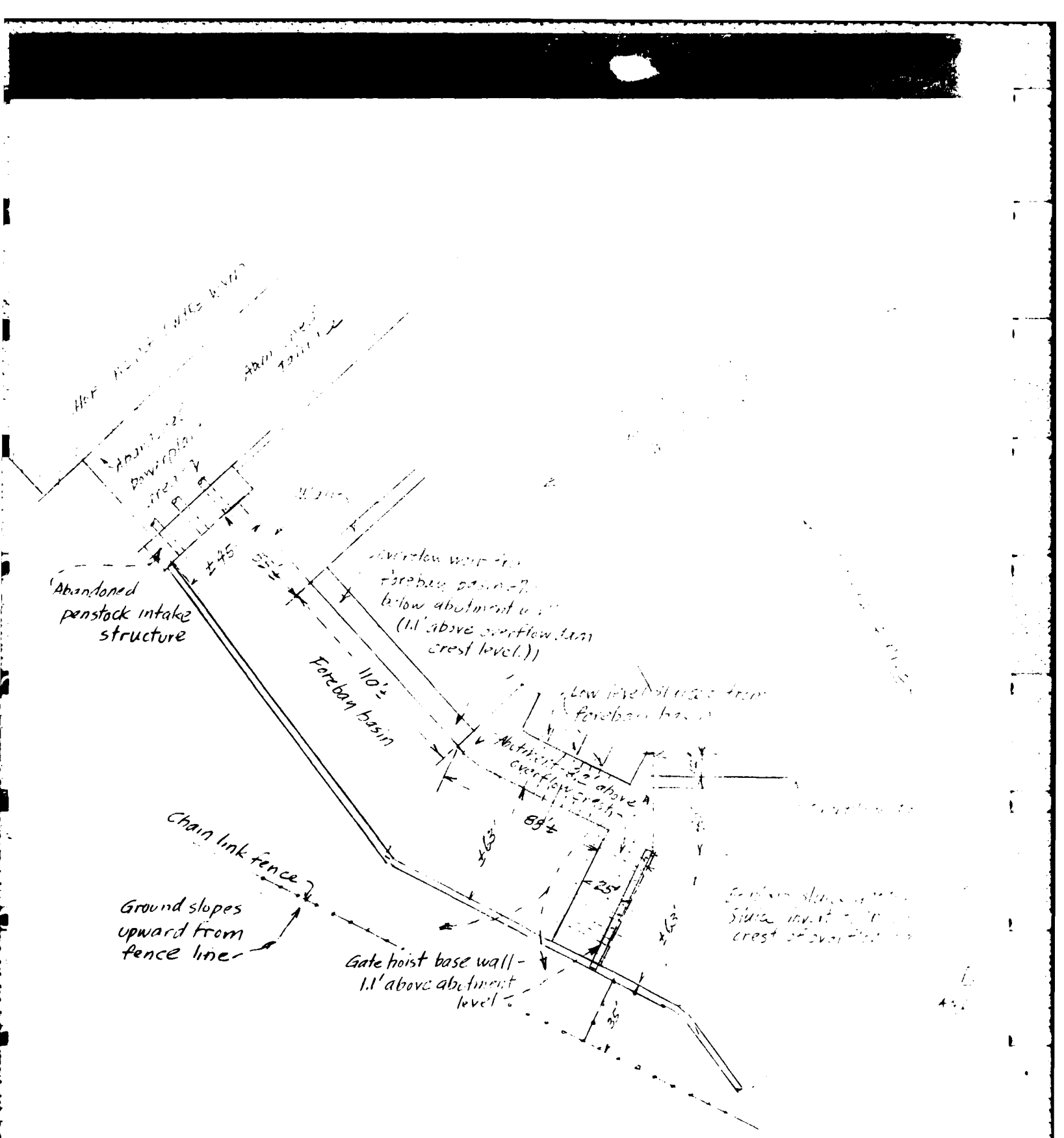
Type of Dike Construction [illegible]

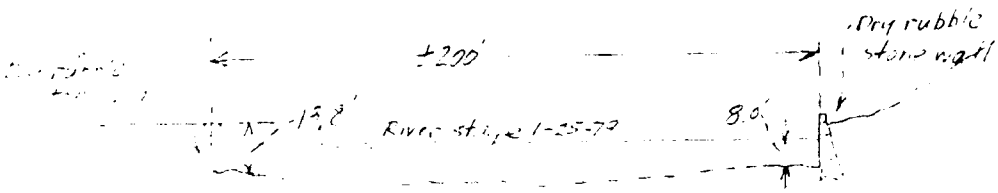
Downstream Conditions [illegible]

Summary of File Data _____

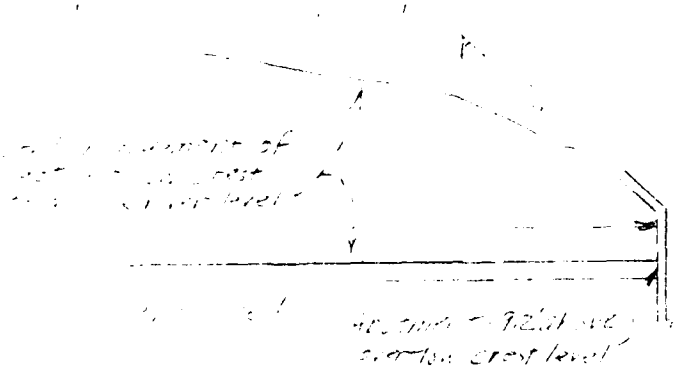
Remarks Date on crushed mill is 1913
There is an additional by pass [illegible] 17' high
40' long 9/16/74
splash boards shown in picture have been removed completely [illegible]

Would Failure Cause Damage? not likely Class A B 1


Abandoned penstock intake structure
±45
110'±
Forebay basin
Chain link fence
Ground slopes upward from fence line
Gate hoist base wall - 1.1' above abutment level
89'±
25'



RIVER CHANNEL CROSS-SECTION
ABOUT 600' BELOW DAM



ASPINOOK DAM ON QUINEBAUG RIVER
NEAR JEWETT CITY - CONN

Appendix B

JUNE 26, 1957

WATER FLOW - JEWETT CITY PROPERTY

THE MILL WATER SUPPLY FOR MANUFACTURING PURPOSES AND ALSO THE WATER USED FOR THE GENERATION OF ALTERNATING CURRENT AND DIRECT CURRENT ELECTRICITY FOR POWER AND LIGHTING IS SUPPLIED FROM THE DAMMED QUINEBAUG RIVER WITH AN AVERAGE FLOW OF BETTER THAN 400 CUBIC FEET PER SECOND FROM A DRAINAGE AREA OF ABOUT 635 SQUARE MILES.

THE MAIN DAM ACROSS THE RIVER IS LOCATED NORTH OF THE MANUFACTURING BUILDINGS AND IS CONSTRUCTED OF REINFORCED CONCRETE, 455 FEET LONG, AND ABOUT 19 FEET HIGH WITH ABOUT 24" OF FLASHBOARDS ABOVE THE TOP OF THE DAM.

ON THE EASTERLY SIDE OF THE RIVER A CANAL HAS BEEN DUG ABOUT 60 FEET WIDE, 260 FEET LONG AND 18 FEET DEEP. THE FOLLOWING GATES ARE ON THE CANAL:-

1.) FIVE ENTRANCE GATES TO ALLOW WATER ABOVE DAM TO FLOW INTO THE CANAL.
2.) THREE GATES AHEAD OF WATER WHEELS AND MILL WATER SUPPLY PIPE.
3.) FIVE WASTE GATES FOR THE ESCAPE OF EXCESS WATER INTO THE RIVER BELOW THE DAM. THERE IS A 160 FOOT LONG SPILLWAY DAM ON THE WEST SIDE OF THE CANAL.

THERE ARE THREE 500 H. P. WATER WHEELS IN OPERATION FOR THE GENERATION OF POWER CONNECTED BY FLAT AND V BELT DRIVES TO GENERATORS AS FOLLOWS:-

A.) WATER WHEEL NO. 1 TO:-
1 - 200 KW D. C. GENERATOR - 250 VOLTS.
1 - 312 KVA ALTERNATING CURRENT GENERATOR 550 V., 3 PHASE, 60 CYCLE, AND COMPLETE WITH EXCITER.

B.) WATER WHEELS NO. 2 AND 3 CONNECTED TO A COMMON SHAFT THENCE TO:-
1 - 200 KW D. C. GENERATOR - 250 VOLTS.
1 - 500 KVA ALTERNATING CURRENT GENERATOR 550 V., 3 PHASE, 60 CYCLE, AND COMPLETE WITH EXCITER.

ALL GENERATED POWER AT THIS PLANT IS FROM THE ABOVE EQUIPMENT. THE ANNUAL POWER GENERATED FOR DISTRIBUTION ON THE SWITCHBOARD ELECTRIC BUS BARS HAS AVERAGED:-

250 VOLT DIRECT CURRENT	-	840,000 K.W.H.
550 VOLT ALTERNATING CURRENT	-	1,960,000 "
TOTAL	-	2,800,000 K.W.H.

WATER SUPPLIES FOR MANUFACTURING FROM THE RIVER ARE LIMITED BY THE SIZES OF THE SUPPLY PIPES TO THE MILL BUILDINGS. THE WATER PIPE MAIN FROM THE CANAL IS 36" DIAMETER.

MAR 30 1970

Inter-Office Correspondence

WYRE WYND INCORPORATED

TO: Theron Jennings c. c.

FROM: J. T. Simmons c. c.

SUBJECT: Sale of Property
Conn. Board of Fisheries and Game c. c.

REF.: c. c.

DATE: March 23, 1970

Lincoln H. Brown, Jr., Land Agent for the Connecticut Board of Fisheries and Game was in to see us last week to discuss the States interest in our newly acquired property. I asked that he have the State write us a letter to officially start the ball rolling. He verbally stated their prime interest as follows:

1. The Dam
2. The Dam Site (the land it sits on)
3. Access to both ends of Dam for maintenance
4. Flowage rights in Quinnebaug River
5. Flowage rights and land known as Browning Cedar Swamp adjacent to Clayville Pond. Area shown on Tadpole sheet of our charts.

I restated our firm intention to use an undetermined amount of water for cooling purposes, and possible power generation.

Mr. Brown informed us that the lowest flowage recorded in a 24 hour period as far back as the earl 1930's was 12,000,000 gallons per day.

Ted Simmons

J. T. Simmons

JTS/mb

STATE OF CONNECTICUT

WATER RESOURCES COMMISSION

STATE OFFICE BUILDING • HARTFORD, CONNECTICUT 06115

December 5, 1969

Mr. James T. Simmons, President
Wyre Wynd, Incorporated
Jewett City Industrial Park
Jewett City, Connecticut

Re: Possibility of flooding former
Aspinook Mill area

Dear Mr. Simmons:

This letter is in reply to your inquiry addressed to the Development Commission concerning the flood history of the Jewett City Industrial Park (former Aspinook Mill area) and information as to actions taken to improve the situation since the floods of 1955.

Although this Commission has not made a study of the area, we have been able to put together some information that you might find useful. The data we found for the most part is from the U. S. Army Corps of Engineers publication (Interim Report Quinebaug River Sub-Basin 31 January 1958).

FLOOD HISTORY - DAM AREA

There are three major floods on record. They occurred in 1936, 1938 and 1955. All three topped the Aspinook Dam, with a maximum height in the range of 8' of water going over the dam. The crest of the dam is estimated to be 95' above mean sea level. From our sketchy information the ground elevation of the complex of buildings near the dam is about 100' above sea level. The possibility exists of water flowing around these buildings along the railroad to the east of the buildings and flooding of the lower floors. In talking with Mr. Lincoln Brown of the Fish and Game Department, we were told that in the 1938 flood the basement floors were flooded.

Enclosed is a copy of three flood profiles along the Quinebaug River from the Aspinook Dam to the U. S. Geological Survey gaging station below the railroad bridge. These show approximate water levels during these floods as they occurred.

EFFECTS OF FLOOD IMPROVEMENTS

The enclosed map shows various flood control measures built on the Quinebaug River and its tributaries since 1955. As a result, the Corps of Engineers estimates river stage downstream from the railroad bridge would be lowered some 9' in the event of recurrence of the 1955 flood, and 6' in the event of a 1938 flood. This would by the same token reduce a 1955 flood to flow slightly below a 1938 flood. The information is summarized below:

Date of Flood	Estimated Probability of Occurrence*	Elevation above M.S.L. above dam	Reduction of River* Stage due to Improvements at USGS Gage Station
March 1936	1.7% chance	103'	3.2'
Sept. 1938	3.0%	102'	6.0'
Aug. 1955	0.6%	104'	9.1'
Dam crest elevation		95.3'	
with flashboards		97.3'	

*Corps of Engineer Estimates

SUMMARY

The available data indicate that the two lower floors of the mill were flooded in 1938, that existing flood control measures would reduce a recurring 1955 flood to about the size of the 1938 flood and that the probability of such flooding (to about elevation 90 at the mill) in each year is estimated to be less than 1%.

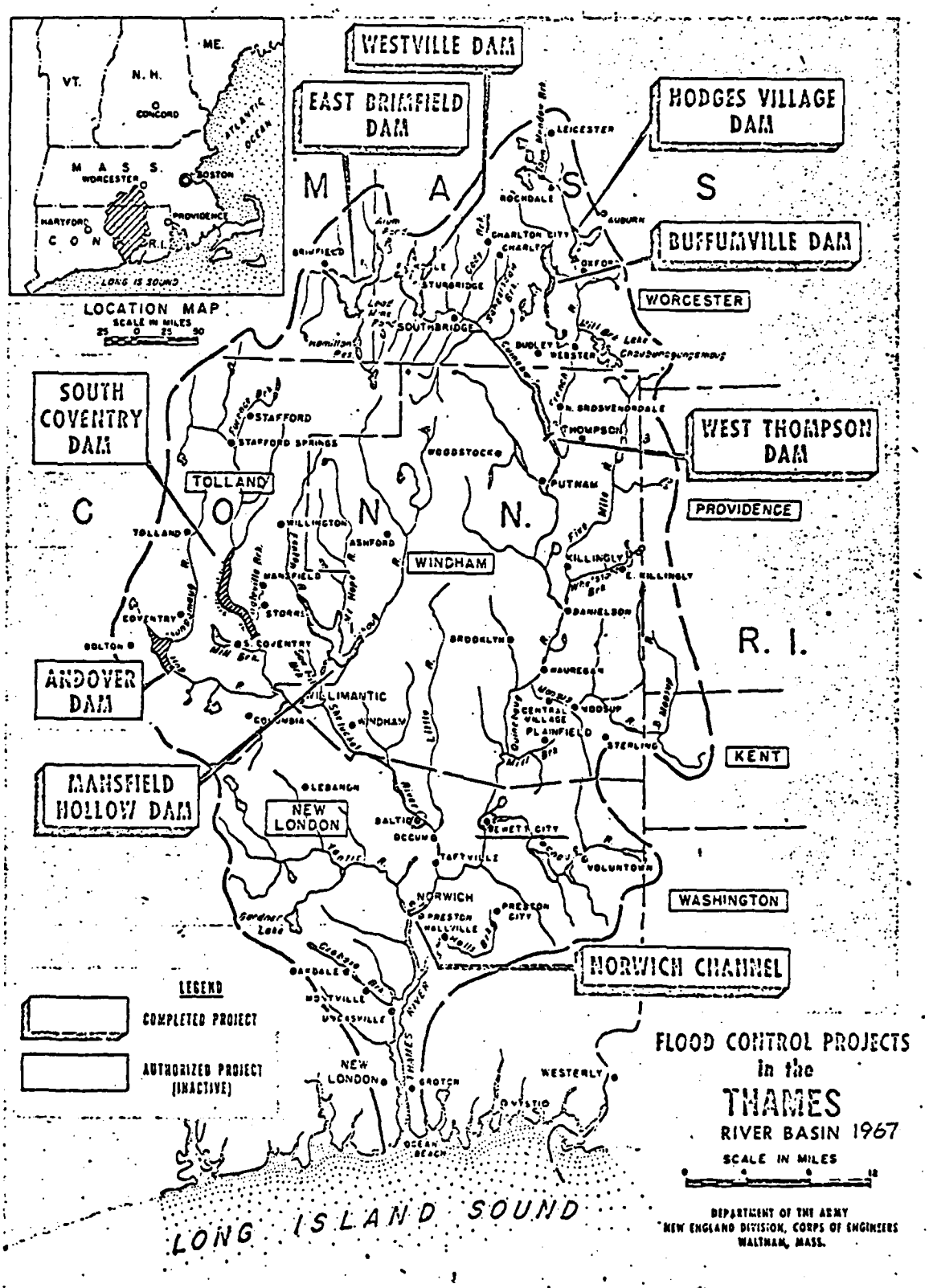
The probability of flooding of the lowest parts of the mill yard are no doubt greater than 1%.

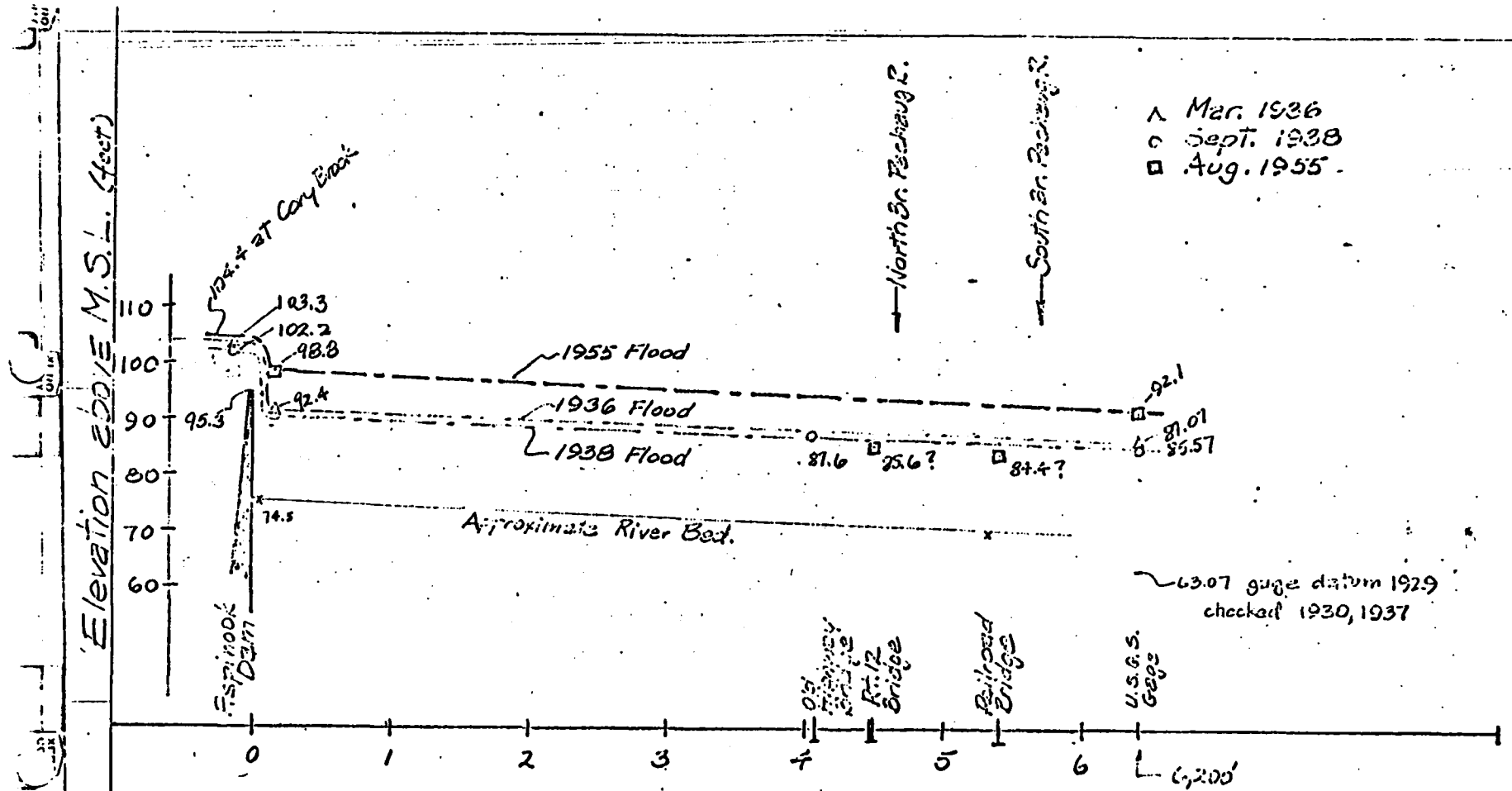
If we might be of further assistance, please feel free to all on us.

Very truly yours,

Charles J. Pelletier
Division Engineer

CJP/AS/tm
Encls
cc: Mr. Charles E. Hills


WESTVILLE DAM
EAST BRIMFIELD DAM
HODGES VILLAGE DAM
BUFFUMVILLE DAM
WORCESTER
SOUTH COVENTRY DAM
WEST THOMPSON DAM
PROVIDENCE
TOLLAND
WINDHAM
KENT
ANDOVER DAM
MANSFIELD HOLLOW DAM
NEW LONDON
WASHINGTON
NORWICH CHANNEL
LOCATION MAP
SCALE IN MILES
25 0 25 50
VT.
N. H.
ME.
CONCORD
MASS.
WORCESTER
BOSTON
HARTFORD
PROVIDENCE
CONN.
R.I.
LONG IS SOUND
ATLANTIC OCEAN
MASS.
CONN.
R. I.
LEGEND
COMPLETED PROJECT
AUTHORIZED PROJECT (INACTIVE)
LONG ISLAND SOUND
FLOOD CONTROL PROJECTS
in the
THAMES
RIVER BASIN 1967
SCALE IN MILES
0 6 12
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.



B-7

FLOOD PROFILES QUINEBAUG RIVER
JEWETT CITY

Dec, 1969 A.S.

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

13 June 1974

Mr. Robert Spadaro
Wyre Wynd, Inc.
Anthony Street
Jewett City, CT

Re: Flood levels on Quinebaug River
Griswold

Dear Mr. Spadaro:

Pursuant to your recent telephone request pertaining to the referenced river, I contacted the Army Corps of Engineers, New England Division.

The information submitted by them indicated that the river flood stage at the Jewett City gauging station, approximately one half mile downstream from your plant, was 29' during the 1955 flood. Due to the construction of flood control structures upstream, the river stage for a comparable storm is computed to be 20' at this same station.

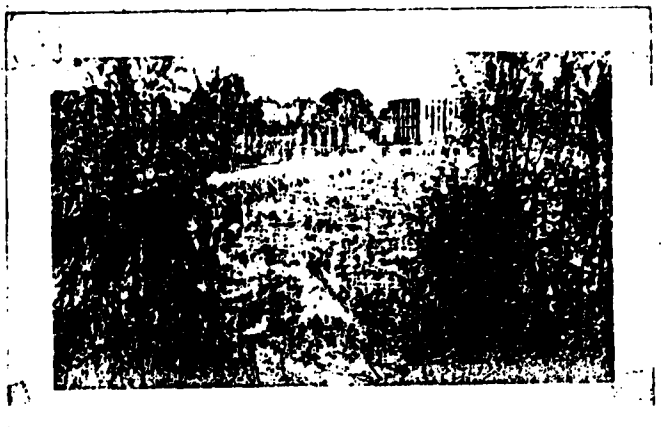
Very truly yours,

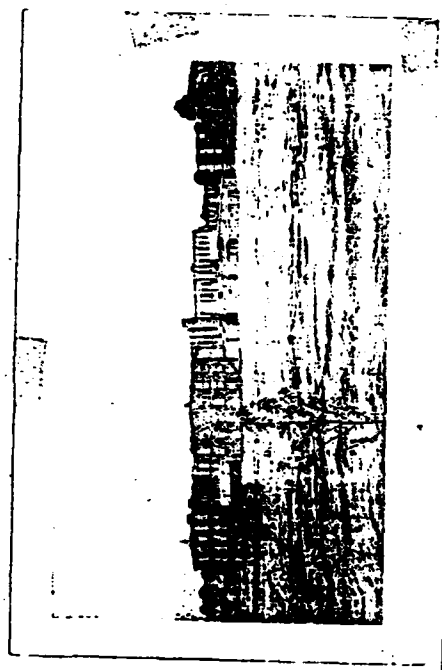
Victor F. Galgowski

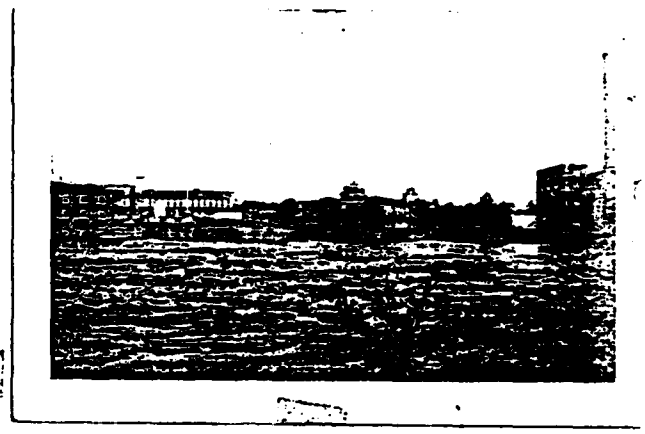
Victor F. Galgowski
Supt. of Dam Maintenance
Water & Related Resources
Telephone no. 566-5506

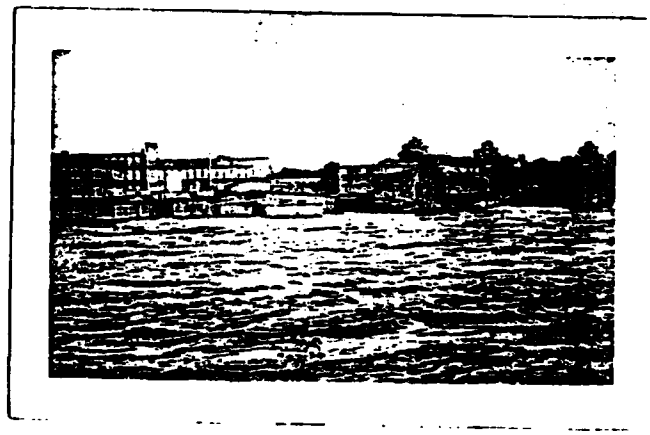
VFG:ljg

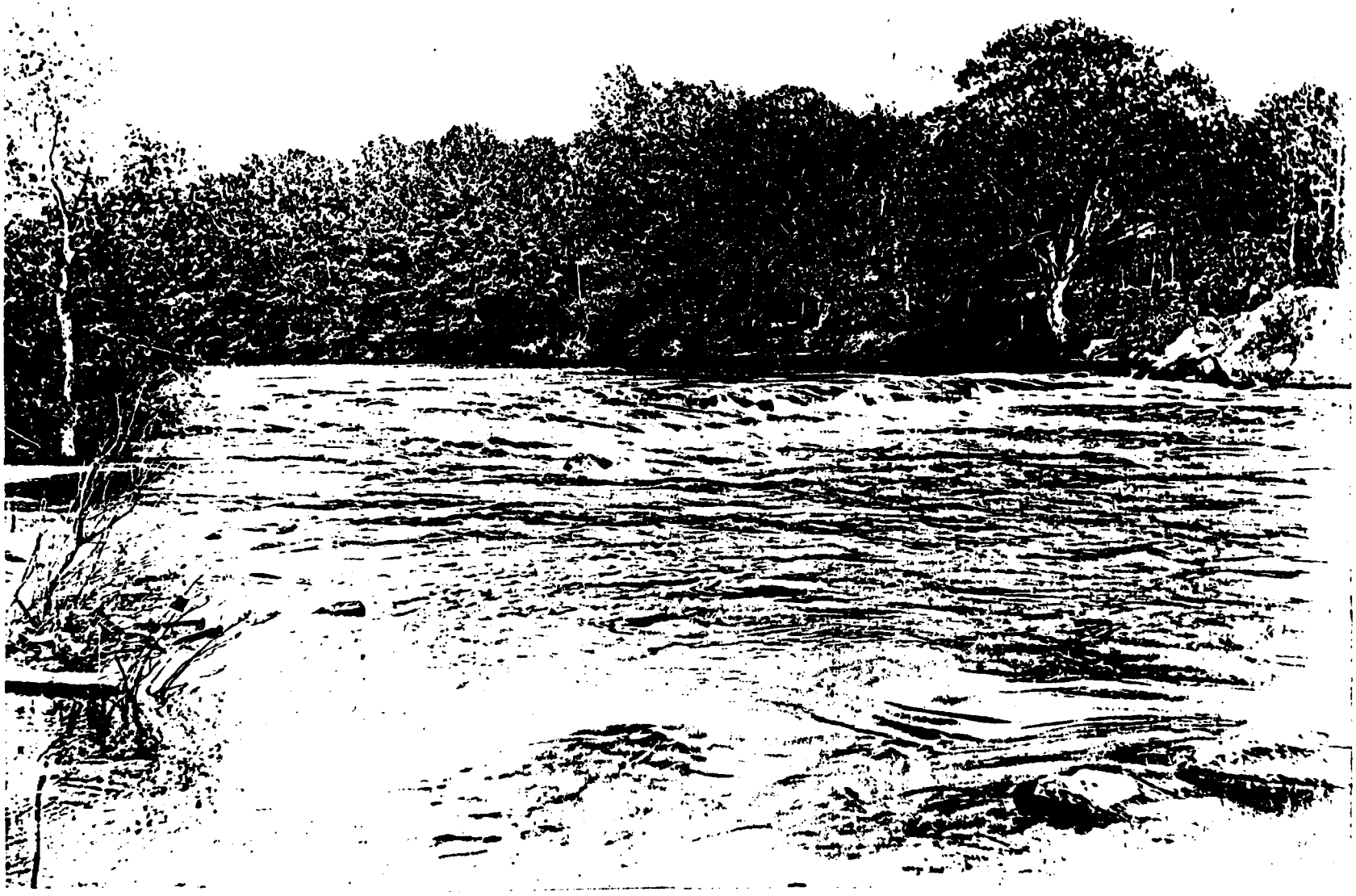
R-B







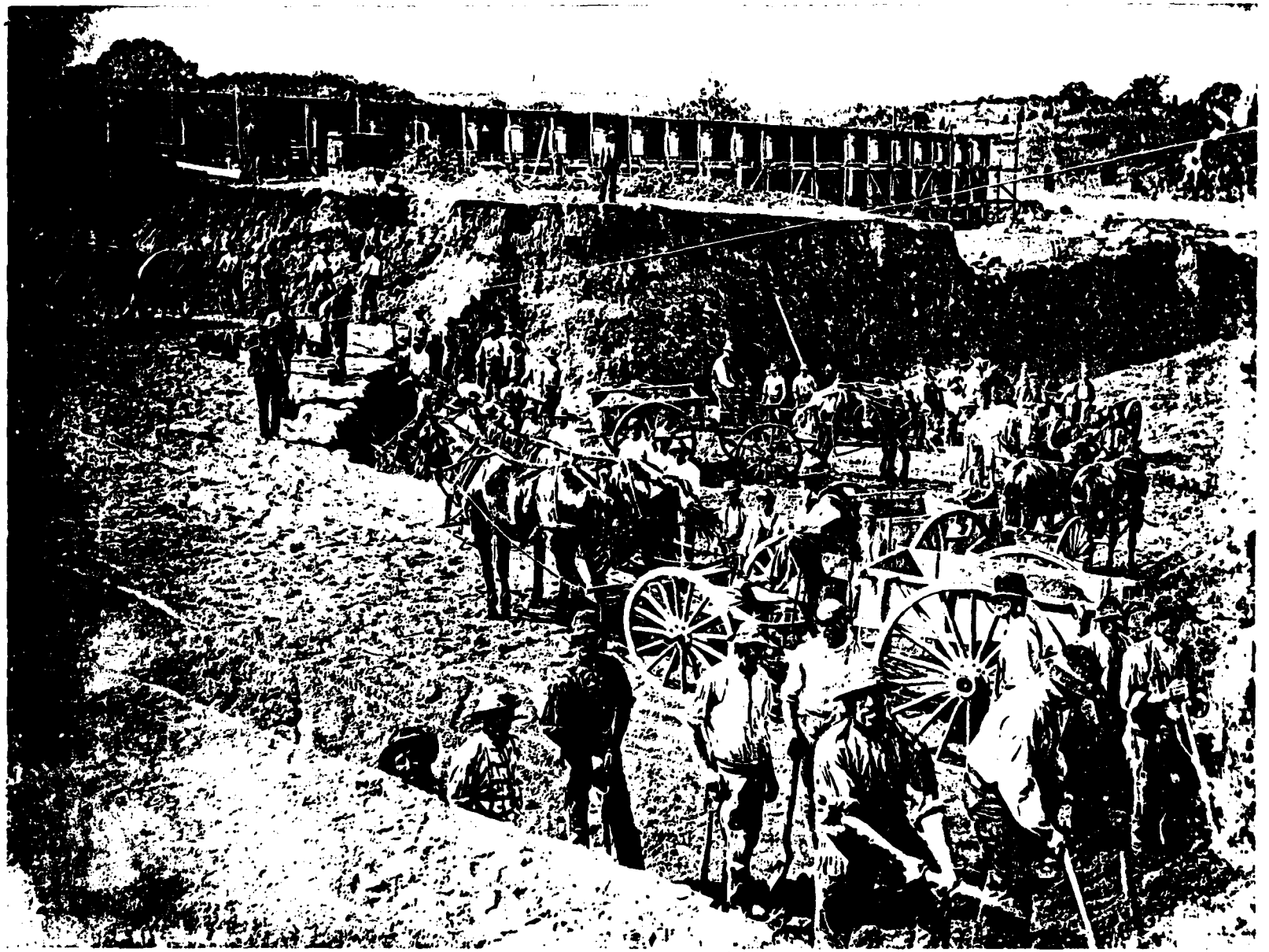




Quinebaug River in flood time.

Quinebaug River Falls, site of Aspinook Dam, from Lisbon.

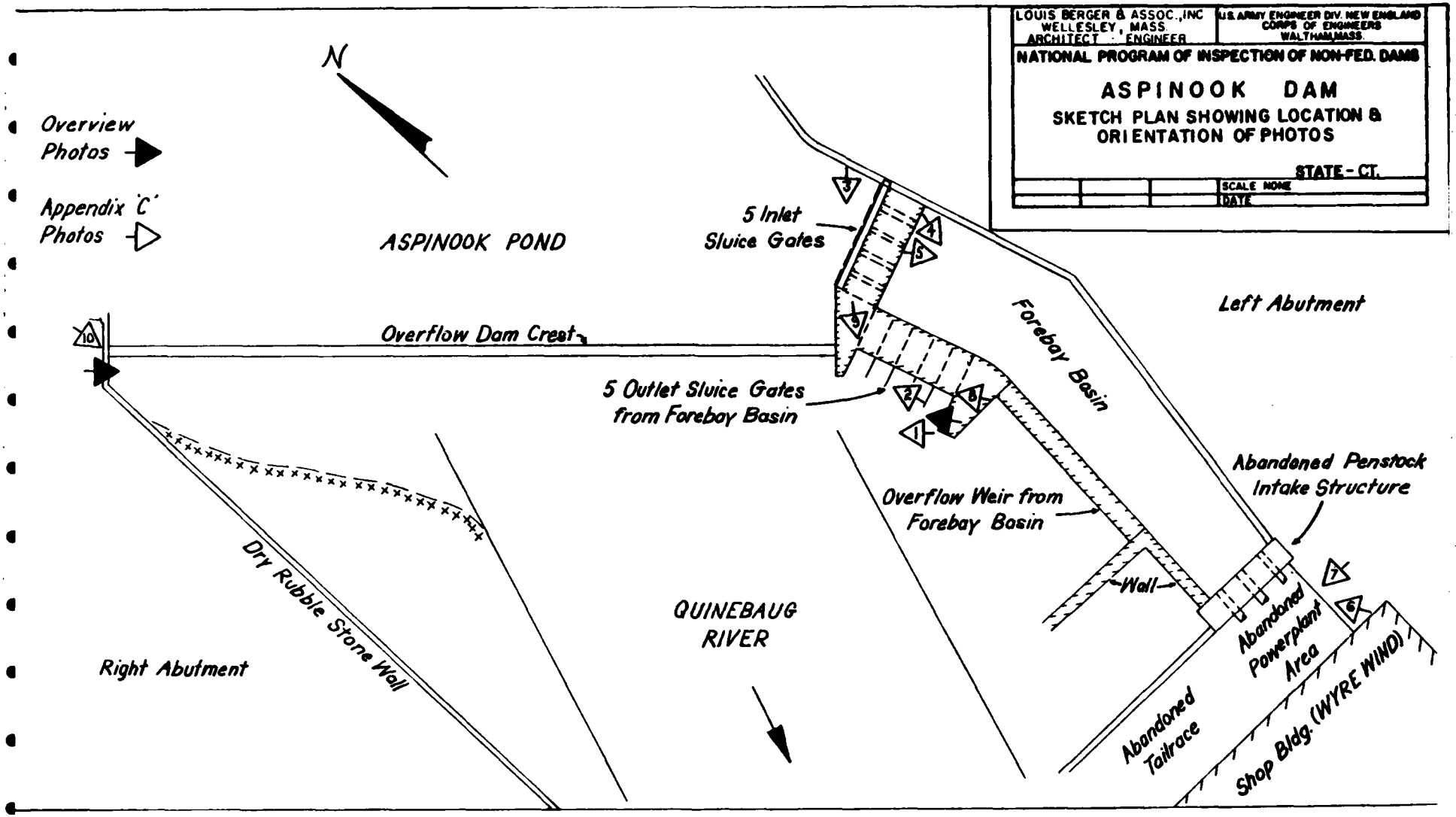
Building Aspinook Dam, 1892
Jewett City in background.



Building Aspinook Mill.
A study in man and horse power.

APPENDIX C

PHOTOGRAPHS

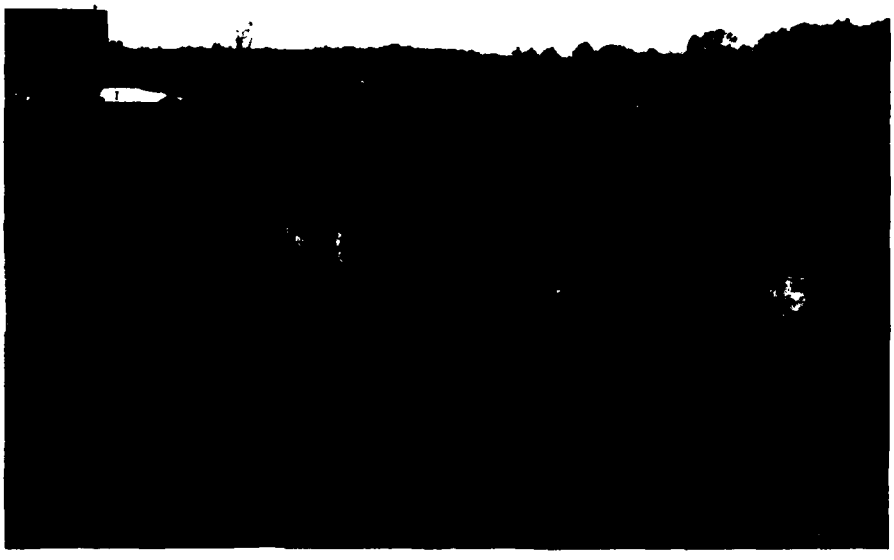

LOUIS BERGER & ASSOC., INC
WELLESLEY, MASS.
ARCHITECT ENGINEER
U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS
ASPINOOK DAM
SKETCH PLAN SHOWING LOCATION & ORIENTATION OF PHOTOS
STATE - CT.
SCALE NONE
DATE
N
Overview Photos
Appendix 'C' Photos
ASPINOOK POND
5 Inlet Sluice Gates
Left Abutment
Overflow Dam Crest
Forebay Basin
5 Outlet Sluice Gates from Forebay Basin
Abandoned Penstock Intake Structure
Overflow Weir from Forebay Basin
Wall
Dry Rubble Stone Wall
QUINEBAUG RIVER
Right Abutment
Abandoned Powerplant Area
Abandoned Tailrace
Shop Bldg. (WYRE WIND)

C-1

1. Rock outcrops and rockly islets in stream bed below dam.

2. Left abutment training wall showing leakage and 3 of 5 outlets from forebay.

3. Entrance gates to forebay in left abutment.



4. Forebay overflow weir and outlet gates.

5. Forebay with 3 outlet gates to abandoned penstocks at downstream end.

6. 3 abandoned penstocks cut off at downstream end of forebay.

7. 36 in. dia. water pipe from forebay to plant (upper) and 24 in. dia. pipe cut off (lower).

8. Tree growth on forebay masonry wall.

9. Downstream channel showing plant buildings (upper left) and abutment wall (lower right).

10. Rock outcrop downstream of right end of overflow section of dam.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

BY RCM DATE 4/12/79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ INSPECTION OF DAMS PROJECT ____

SUBJECT DRAINAGE AREA - CT 539

CONN. NO NAME # 36

LINE NO. 19

METHOD

DRAINAGE AREA IS COMPUTED BY OBTAINING A_D OF GAGING STA. DOWNSTREAM AND SUBTRACTING AREA BETWEEN GAGING STA. & DAM.

GAGING STA A_D = 715 SQ. MI. PG 89 - 1976 USC&GS WRD

P.L. READINGS $1^{\square} = (2000')^2 = 4,000,000$ S.F.

PLAINFIELD QUAD — 7.1 $^{\square}$

ONECO — 21.0
6.8

VOLUNTOWN 10" x 12" = 120.0
6" x 8" = 48.0
9.7
15.6
9.0
8.5

JEWETT
22.7 x 2 =
11.0 x 6.9 =
7.3
17.4
1.1
6.6
20.6
20.2

NORWICH — 5.1

OLD MYSTIC — 4.8

328.8 $^{\square}$

$$\frac{328.8^{\square} \times 4,000,000.}{(43,560)(640)} =$$

$$\frac{30,192.8 \text{ AC}}{640} =$$

47.18 SQ. MI.

715 SQ MI - 47.18 SQ MI

= 667.8 SQ MI.

BY RFB DATE 10-29-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF

CHKD. BY DATE INSPECTION OF DAMS PROJECT

SUBJECT ASPINOOK POND DAM - STORAGE CAPACITY

AREA @ ELEV 97 (SPILLWAY LEVEL) USGS

READ #2 33.49 READ #3 36.23 AVE = 2.675 [III]
" #1 30.88 " #2 33.49 AREA = 245.6 ACRES
2.61 2.74

AREA @ ELEV 100

READ #2 54.56 READ #3 60.44 AVE 5.85 [III]
" #1 48.75 " #2 54.56 AREA = 537.2 ACRES
5.81 5.88

AREA @ ELEV 110

READ #2 72.98 READ #3 84.36 READ #5 95.57
" #1 60.32 " #2 72.98 READ #4 84.36
12.66 11.38 11.21

AVE 11.30

+

READ #7 39.87 READ #8 40.65 AVE 0.74
" #6 39.16 " #7 39.87
.71 .78

TOTAL = 11.30 + .74 = 12.04 [III]
AREA = 1106 ACRES

CAPACITY @ SPILLWAY CREST = 21.5 X 246 X ½

= 2645 ACRE-FT

FROM DAM INVENTORY STORAGE = 2640 ACRE-FT ✓

SAY STORAGE = 2645 ACRE-FT

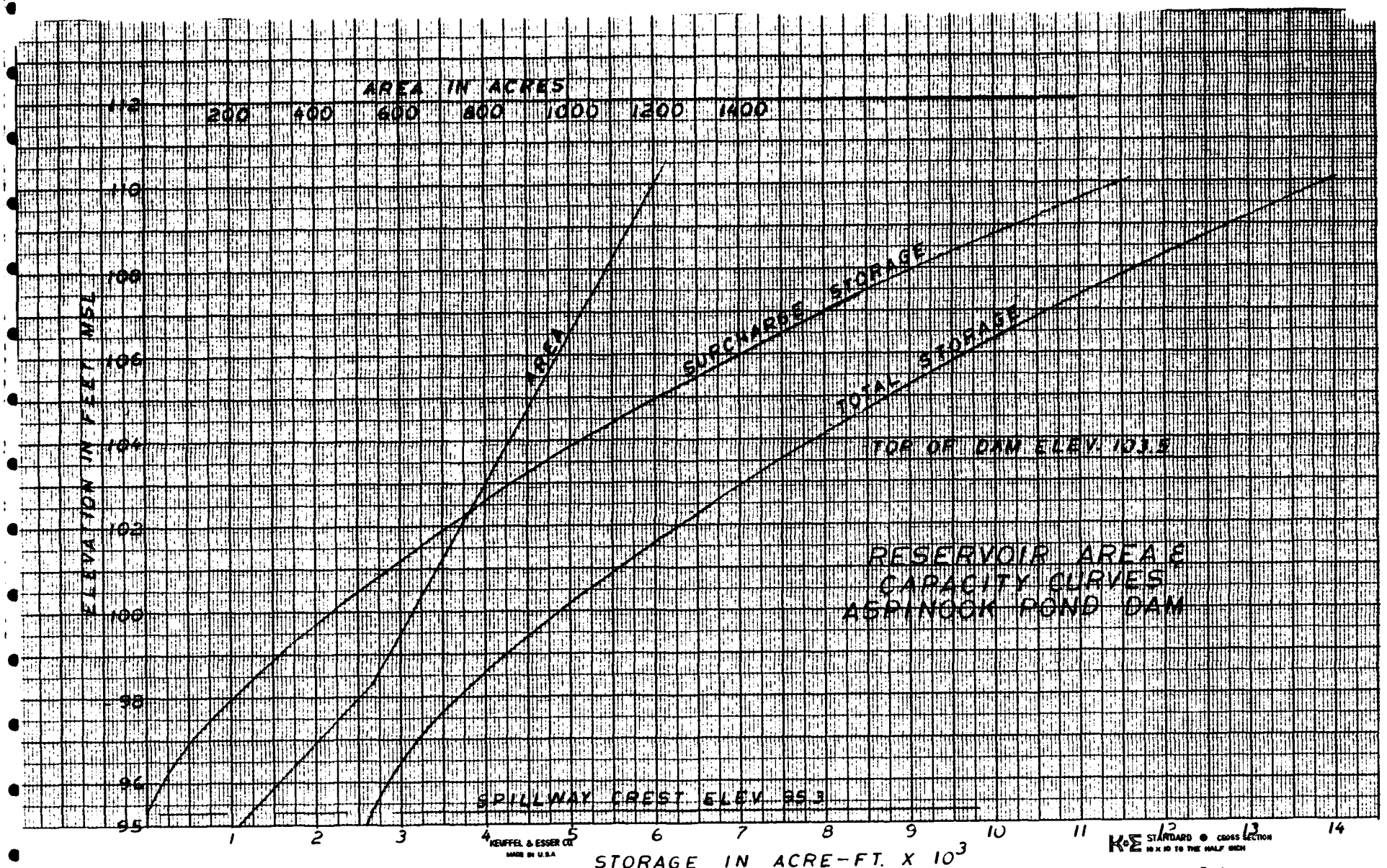
FROM FLOOD PROFILE SHEET B-7 ELEV, 95.3 = POOL ELEV 97.0 ON U.S.G.S. TOPO SHEET.

BY RFB DATE 10-29-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 2 OF

CHKD. BY DATE INSPECTION OF DAMS PROJECT

SUBJECT ASPINOOK POND DAM - STORAGE CAPACITY

ELEV. FT	AREA SQ. FT	AVE AREA	ΔH	Δ STORAGE	TOTAL STORAGE	SURCHARGE STORAGE
95.3	246				2645	0
96.3	343	294.5	1	294	2939	294
97.3	440	391.5	1	392	3331	686
98.3	537	488.5	1	488	3819	1174
100.3	651	594	2	1188	5007	2362
102.3	765	708	2	1416	6423	3778
104.3	878	821.5	2	1643	8066	5421
106.3	992	935	2	1870	9936	7291
108.3	1106	1049	2	2098	12034	9389


AREA IN ACRES
200
400
600
800
1000
1200
1400
ELEVATION IN FEET MSL
110
108
106
104
102
100
98
96
95
AREA
SURCHARGE STORAGE
TOTAL STORAGE
TOP OF DAM ELEV. 103.5
SPILLWAY CREST ELEV. 95.3
RESERVOIR AREA & CAPACITY CURVES
ASPINOOK POND DAM
1
2
3
4
5
6
7
8
9
10
11
12
13
14
STORAGE IN ACRE-FT. X 10³
KEUFFEL & ESSER CO
MADE IN U.S.A.
K&E STANDARD CROSS SECTION
10 X 10 TO THE HALF INCH

D-4

BY REB DATE 2-14-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF

CHKD. BY DATE INSPECTION OF DAMS PROJECT

SUBJECT ASPINOOK POND DAM, TEST FLOOD DATA

D.A. = 667.8

SIZE CLASSIFICATION = INTERMEDIATE

HAZARD CLASSIFICATION = SIGNIFICANT

INSPECTION FLOOD = ½ PMF TO FULL PMF

CALCULATE PMF USING "PRELIMINARY GUIDANCE FOR ESTIMATING MAXIMUM PROBABLE DISCHARGE IN PHASE I DAM SURVEY INVESTIGATIONS, MARCH 1978."

ASSUME THAT DRAINAGE AREAS ABOVE C.O.E. PROJECTS AT WEST THOMPSON, HODGES VILLAGE, AND BUFFUMVILLE DO NOT CONTRIBUTE TO PMF AT ASPINOOK POND DAM.

ENTIRE DRAINAGE AREA	= 667.8
ABOVE WEST THOMPSON	= 173.5
ABOVE HODGES VILLAGE	= 31.1
ABOVE BUFFUMVILLE	= 26.5
NET DRAINAGE AREA =	436.7

USING CORPS ENVELOPE CURVE:

FOR A = 436.7, ROLLING TERRAIN, PEAK = 530 CFS/MI²
FLAT & COSTAL, PEAK = 220 CFS/MI²

$Q_{PMF} = 375 (436.7) = 163,762$ AVE = 375

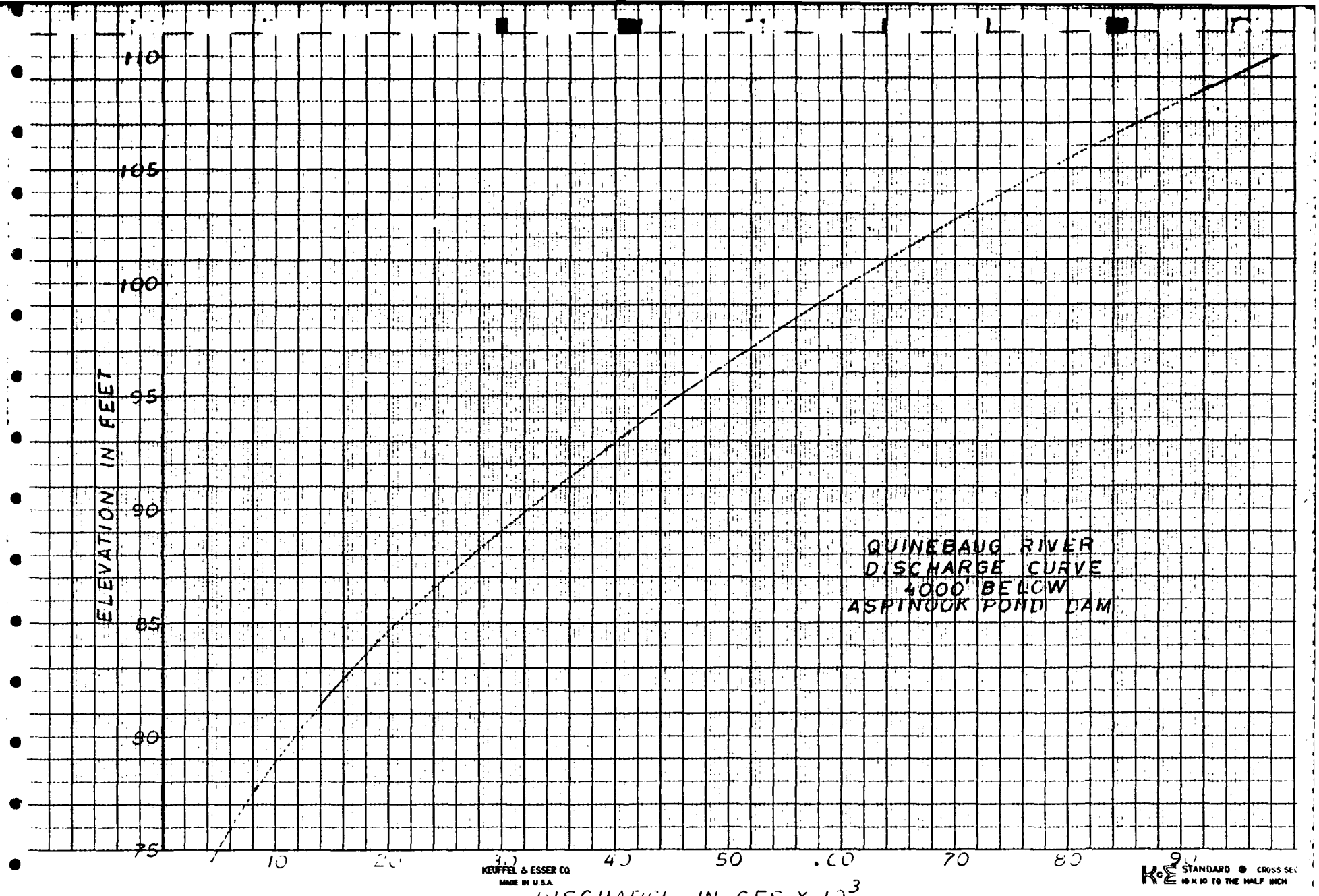
$\frac{1}{2}$ PMF $= \frac{163,762}{2} = 81,881$ CFS

USE $Q_{TEST} = 82,000$ CFS

ONLY AREA WHERE SIGNIFICANT FLOODING OCCURS ON QUINEBAUG BETWEEN DAM & SHETUCKET RIVER IS 2300 FT UPSTREAM OF U.S.G.S GAGE No. 01127000. USE THIS GAGE DATA FOR STAGE-DISCHARGE CURVE. DATA SOURCE: GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1420 "FLOODS OF AUGUST-OCTOBER 1955..."

SLOPE OF RIVER ≅ .00047, ADD 1 FT FOR 2300 UPSTREAM OF GAGE.

GAGE HT	GAGE ELEV	2300' U.S. ELEV	Q CFS
5.35	68.4	69.4	518
6.26	69.3	70.3	1020
7.70	70.8	71.8	1960
10.34	73.4	74.6	4430
11.70	74.8	75.9	5970
13.5	76.6	77.7	8210
16.8	79.9	80.9	13,300
18.5	81.6	82.6	16,200
20.1	83.2	84.2	19,000
22.4	85.5	86.6	23,900
24.8	87.9	88.9	29,500
26.8	89.9	90.9	34,500
28.5	91.6	92.6	39,200
29.0	92.1	93.1	40,700


110
105
100
95
90
85
80
75
ELEVATION IN FEET
10
20
30
40
50
60
70
80
90
QUINEBAUG RIVER
DISCHARGE CURVE
4000' BELOW
ASPINOOK POND DAM
KEUFFEL & ESSER CO.
MADE IN U.S.A.
DISCHARGE IN CFS X 10³

D-7

BY REB DATE 3-14-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 2 OF

CHKD. BY DATE PROJECT

SUBJECT ASPINOOK POND DAM - PRELIM H&H

TAKE TYPICAL SECTION JUST UPSTREAM OF OLD BRIDGE SITE

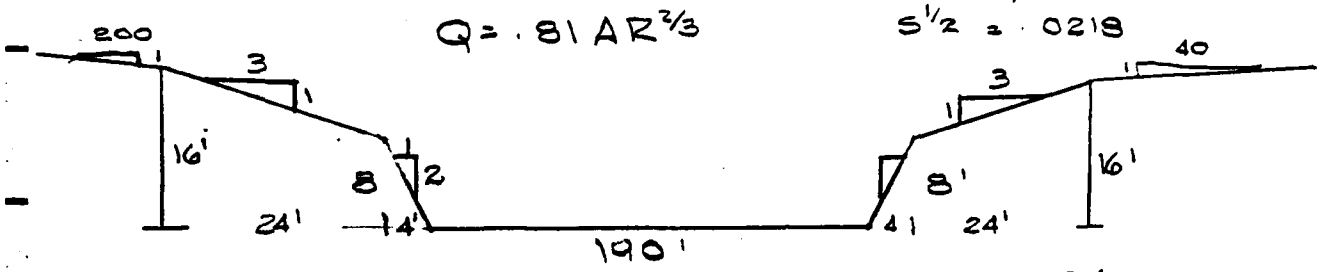
$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$

$n = 0.040$

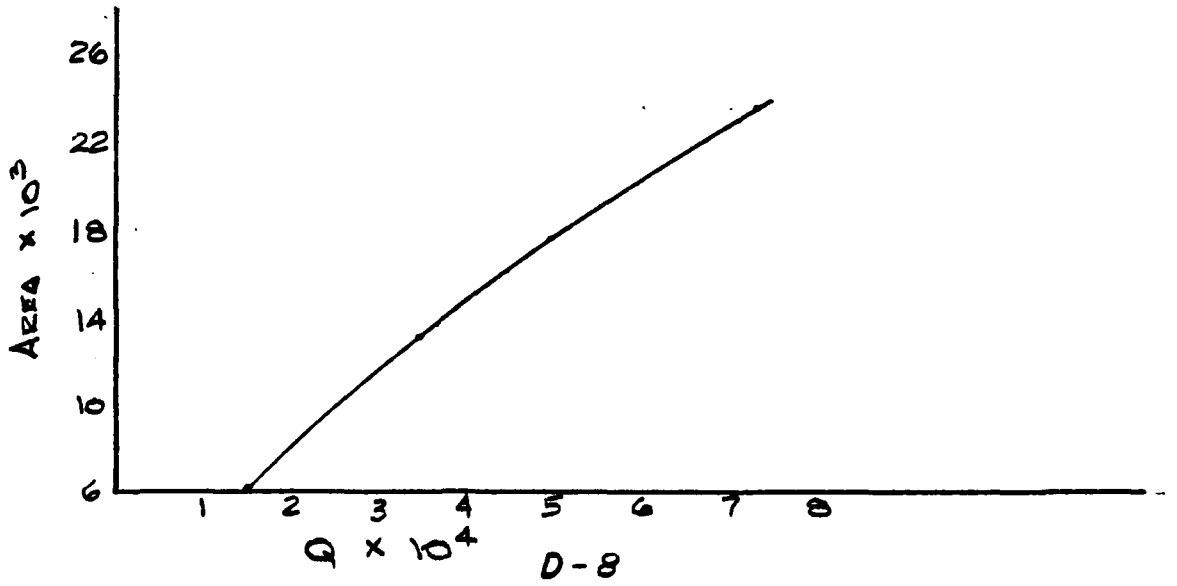
$S = \frac{10}{21000} = .00047$

$Q = .81 A R^{2/3}$

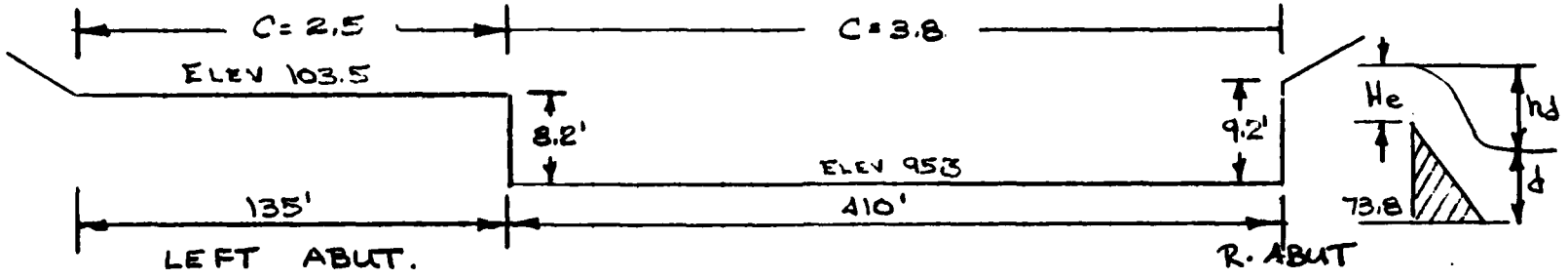
$S^{1/2} = .0218$



STAGE	Δ AREA	AREA	P	R	$R^{2/3}$	Q
2	382	382	194.5	1.96	1.59	497
4		768	199.3	3.85	2.46	1530
6		1158	203.8	5.68	3.19	2992
8		1552	208.2	7.45	3.82	4802
10		1960	220.6	8.88	4.29	6510
12		2392	233.3	10.25	4.72	9145
14		2848	245.9	11.58	5.12	13,801
16		3328	258.6	12.87	5.50	14,826
20		6232	1218.6	5.11	2.97	14992
24		12992	2179	5.96	3.29	34622
28		23584	3139	7.51	3.83	73164
32						



D-8



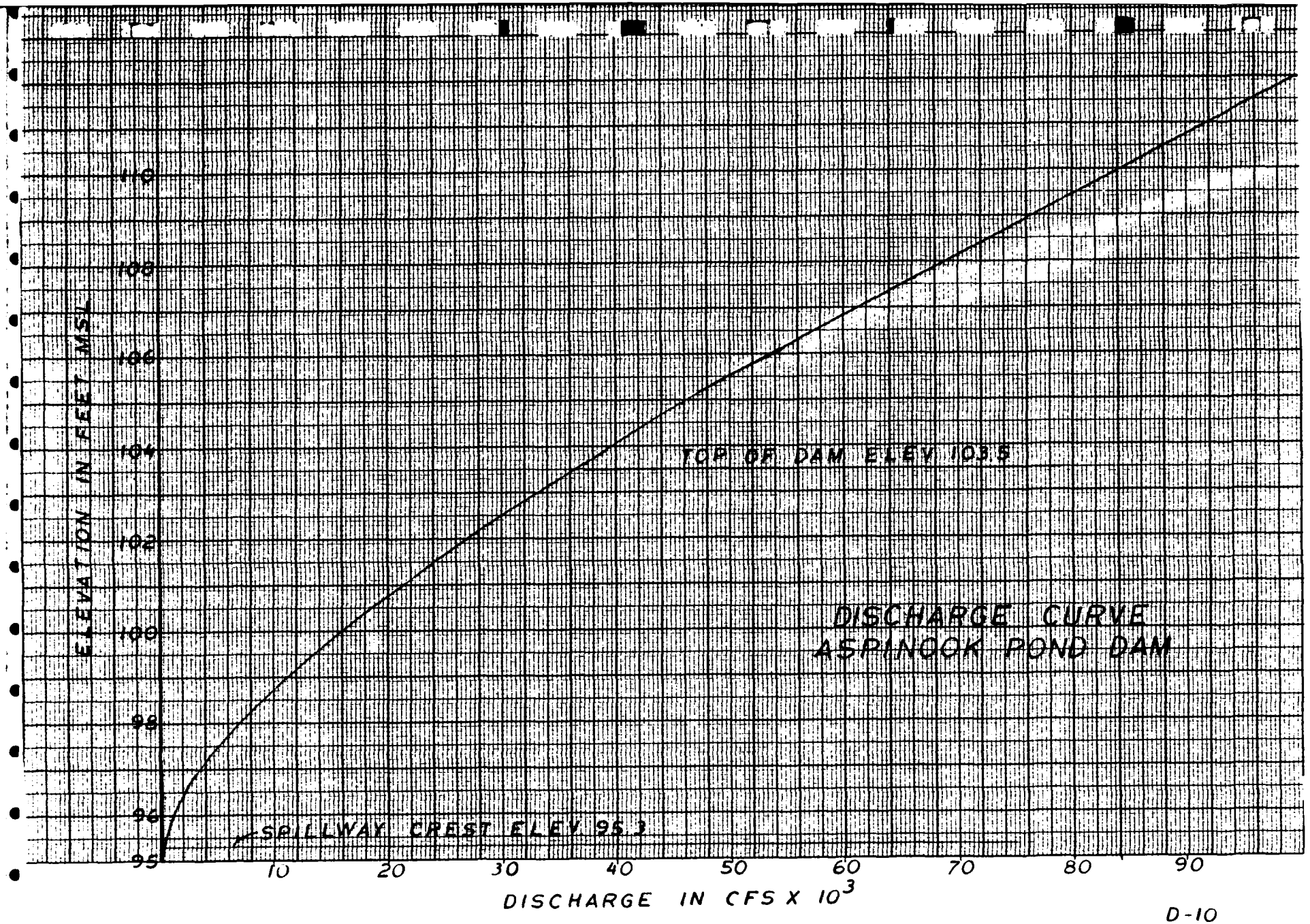
ELEV @ CREST	He	Q	ELEV TAIL'R	d	hd	$\frac{hd+d}{He}$	$\frac{hd}{He}$	* % RED	Q CFS
96	0.7	900	~	~	~	~			900
97.5	2.2	5100	77.0	3.2	20.5	10.8	9.3	0	5100
91.0	3.7	11100	81.6	7.8	17.4	6.8	4.7	0	11100
100.5	5.2	18500	85.1	11.3	15.4	5.1	3.0	0	18500
102	6.7	27000	89.4	15.6	12.6	4.2	1.9	0	27,000
103.5	8.2	36600	93.6	19.8	9.9	3.6	1.2	0	36,600
104	8.7	40,000	95.0	21.2	9.0	3.5	1.0	0	40,000
106	10.7	54,500	99.4	25.6	6.6	3.0	0.6	1.3	53800
108	12.7	70,500	104.2	30.4	3.8	2.7	0.3	6	66,300 ①
110	14.7	87,800	109.2	35.4	0.8	2.5	0.055	47	①

LEFT ABUTMENT

104	0.5	100
106	2.5	1300
108	4.5	3,200
110	6.5	5,600

* FROM Fig 252 DSD

NOTE: ① CONTROL SWITCHES TO DOWNSTREAM FROM QUINEBAUG RATING CURVE
@ 82,000 STAGE = 106+2 = 108 FT
@ 100,000 STAGE = 110+2 = 112 FT



DISCHARGE CURVE
ASPINOOK POND DAM

BY RFB DATE 11-1-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF

CHKD. BY DATE INSPECTION OF DAMS PROJECT

SUBJECT ASPINOOK POND - DOWNSTREAM HAZARD ANALYSIS

STEP 1: ASSUME DAM BREACHS WHEN WATER LEVEL IS AT TOP OF DAM ELEV 103.5

TOTAL STORAGE, S = 7,950 ACRE-FT

STEP 2: FIND PEAK FAILURE OUTFLOW, Q_{P_1}

$$Q_{P_1} = 8/27\ W_b \sqrt{g}\ y_o^{3/2}$$

W_b = 40% OF 410' = 164 FT

y_o = 21.5 FT

$$Q_{P_1} = 1.68\,(164)(21.5)^{3/2} = 27,467$$

TOTAL Q OVER SPILLWAY @ 103.5 = 36,600

TOTAL Q_1 = 27,467 + 60% (36,600)

= 27,467 + 21,960

$Q_{P_1} \cong 49,500$

FOR Q = 49,500 CFS, AREA ≅ 17,400

FOR Q = 36,600 CFS, AREA ≅ 13,700

ΔA = 3700 SQ.FT

STORAGE BETWEEN DAM AND 4000 FT DOWNSTREAM = V

$$V_1 = \frac{3700 \times 4000}{43,560} = 340 \text{ ACRE-FT}$$

Q_{P2} (TRIAL) = $49,500\left(1 - \frac{340}{7955}\right)$ =

" = $49,500(1 - .043)$

" = 47,372

@ 47,372 AREA ≈ 16,400

$\Delta A = 17,400 - 16,400 = 1000$

$V_2 = \frac{1000 \times 4000}{43,560} = 92$ ACRE-FT

$V_{AVE} = \frac{340 + 92}{2} = 216$

$Q_{P2} = 49,500\left(1 - \frac{216}{7950}\right)$

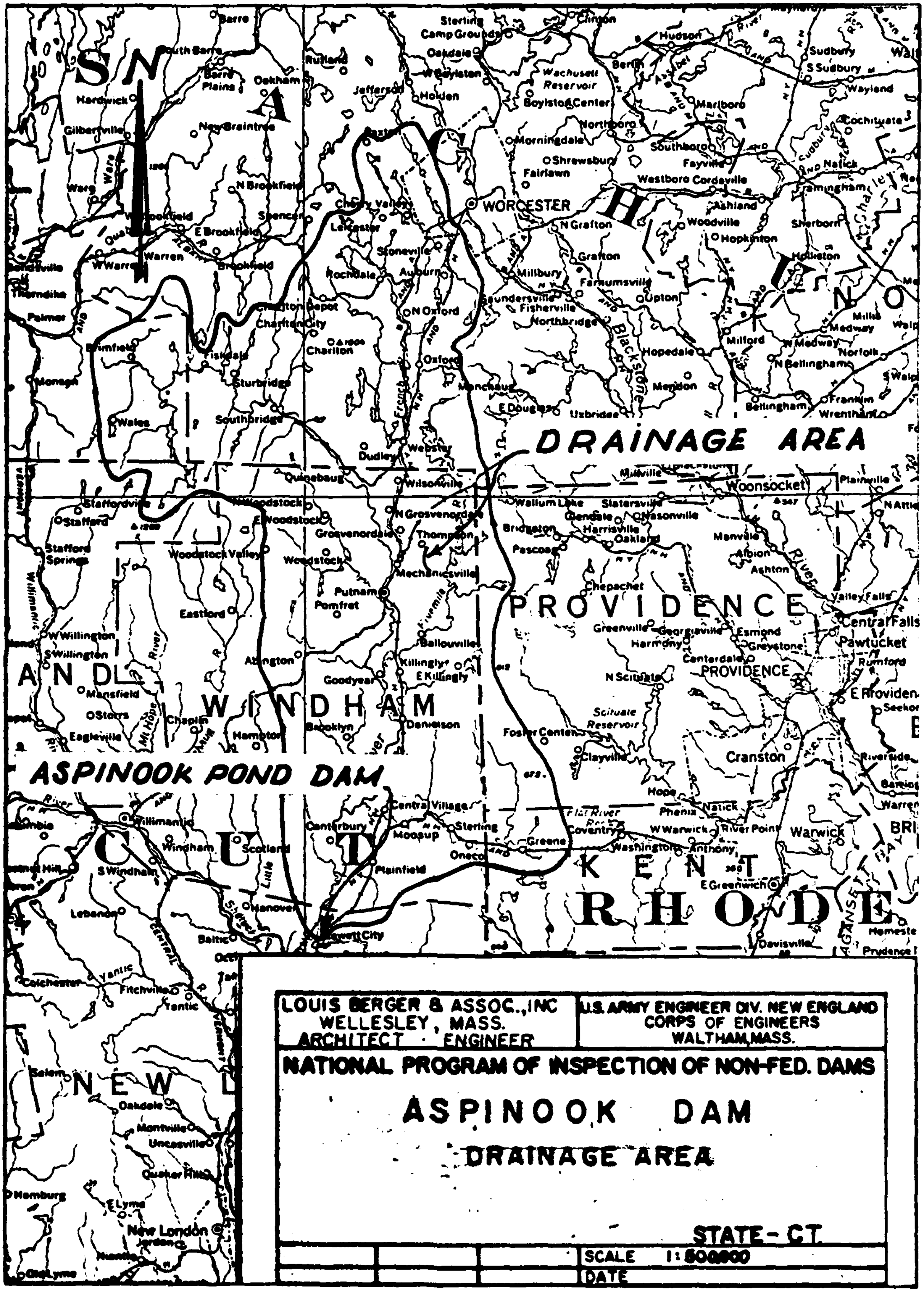
$= 49,500(1 - .03) \approx 48,000$ CFS

FROM RATING CURVE

@ Q = 48,000 CFS STAGE = 95.8 MSL

@ Q = 36,600 CFS STAGE = 91.9 MSL

$\Delta S = 3.9$ FT



LOUIS BERGER & ASSOC., INC
WELLESLEY, MASS.
ARCHITECT · ENGINEER

U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

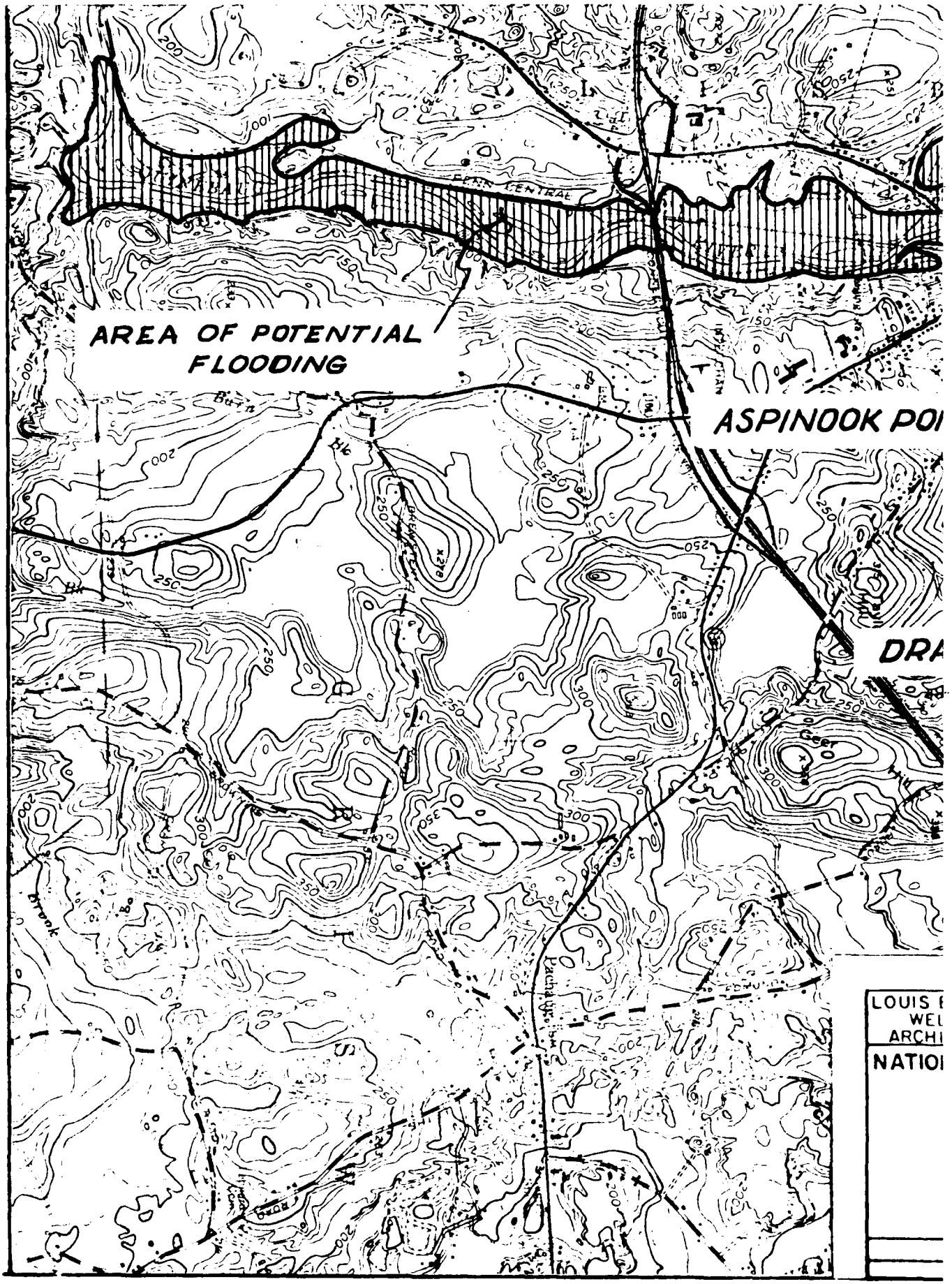
ASPINOOK DAM

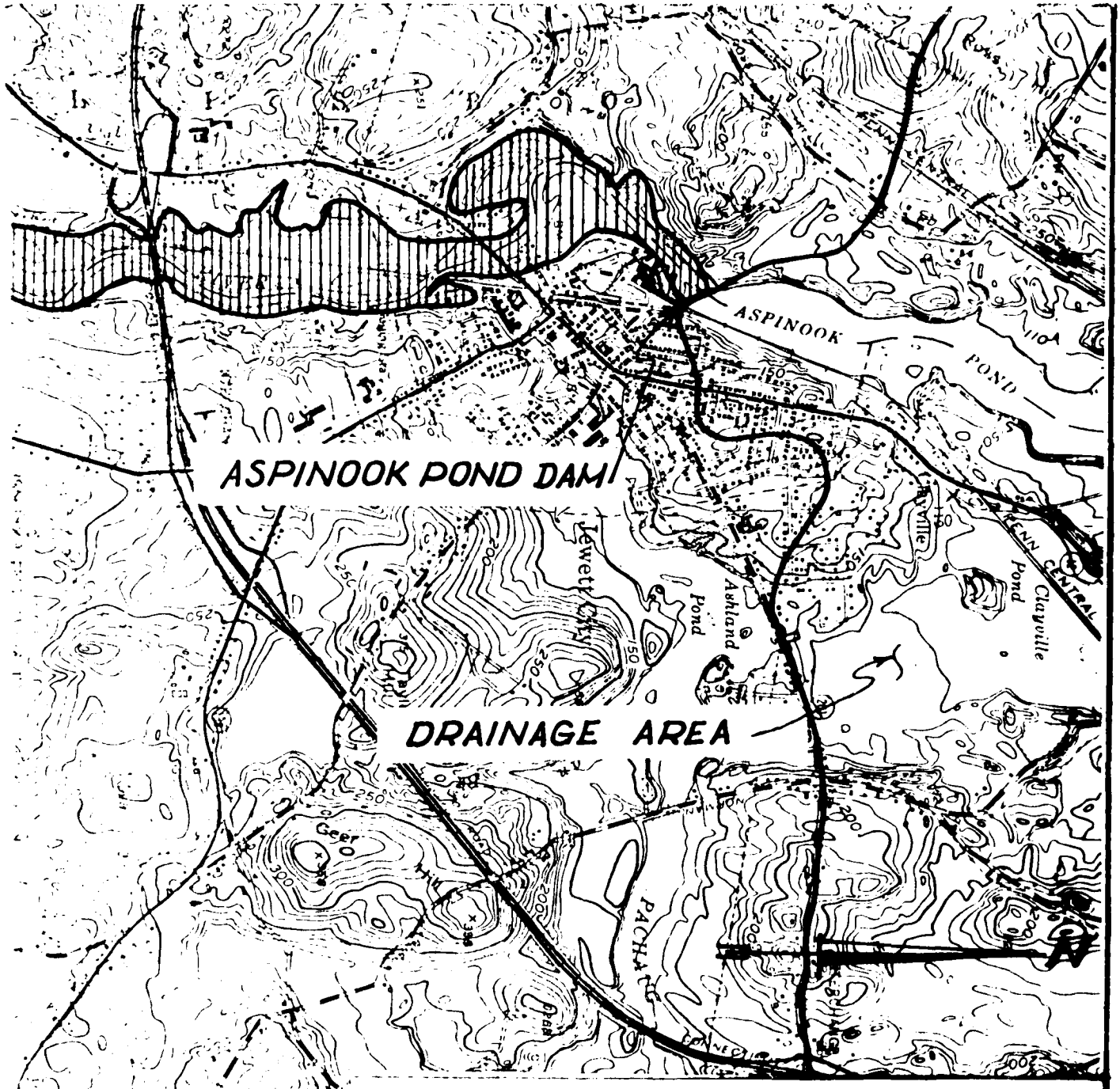
DRAINAGE AREA

STATE - CT.

SCALE 1: 500,000

DATE


AREA OF POTENTIAL
FLOODING
ASPINOOK POI
DRA
PENN CENTRAL
Burn
Brook
Patchaug
LOUIS
WEL
ARCHI
NATIO



LOUIS BERGER & ASSOC., INC WELLESLEY, MASS. ARCHITECT ENGINEER	US ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

ASPINOOK DAM

DRAINAGE AREA AND AREA OF POTENTIAL FLOODING

STATE - CT.

			SCALE 1:24000
			DATE

D-14

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APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTITY NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR. DIST.	(7) STATE	(8) COUNTY	(9) CONGR. DIST.	(10) NAME	(11) LATITUDE (NORTH)	(12) LONGITUDE (WEST)	(13) REPORT DATE DAY	MO	YR
CT	539	NED	CT	011	02				ASPINOOK POND DAM	4130.6	7159.2	26	OCT	79

(14) POPULAR NAME	(15) NAME OF IMPOUNDMENT
	ASPINOOK POND

(16) REGION	(17) BASIN	(18) RIVER OR STREAM	(19) NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	(20) DIST FROM DAM (MI.)	(21) POPULATION
01	07	QUINEBAUG RIVER	JEWETT CITY	1	6000

(22) TYPE OF DAM	(23) YEAR COMPLETED	(24) PURPOSES	(25) STRUCTURAL HEIGHT (FT.)	(26) HYDRAULIC HEIGHT (FT.)	(27) IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	NORMAL (ACRE-FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
REPGOT	1915	RO	22	22	7450	2645	NED	N	N	N	N	

(28) REMARKS
21-STONE, 20-ESTIMATE, 23-INDUSTRIAL SUPPLY

(29) D/S HAS	(30) SPILLWAY CREST LENGTH	(31) SPILLWAY TYPE	(32) SPILLWAY WIDTH (FT.)	(33) MAXIMUM DISCHARGE (FT.)	(34) VOLUME OF DAM (CY)	(35) POWER CAPACITY INSTALLED (MW)	(36) POWER CAPACITY PROPOSED (MW)	(37) NAVIGATION LOCKS NO.	(38) LENGTH (FT.)	(39) WIDTH (FT.)	(40) LENGTH (FT.)	(41) WIDTH (FT.)	(42) LENGTH (FT.)	(43) WIDTH (FT.)	(44) LENGTH (FT.)	(45) WIDTH (FT.)
2	550	U	410	36600	9200											

(46) OWNER	(47) ENGINEERING BY	(48) CONSTRUCTION BY
WYRE WYND, INCORPORATED		

(49) REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	NONE

(50) INSPECTION BY	(51) INSPECTION DATE DAY	MO	YR	(52) AUTHORITY FOR INSPECTION
LOUIS BERGER & ASSOCIATES, INC.	26	OCT	79	PL92-367

(53) REMARKS

END

FILMED

10-84

DTIC